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THE GEOGRAPHICAL JOURNAL

Vol LXXIII No 5 May 1929

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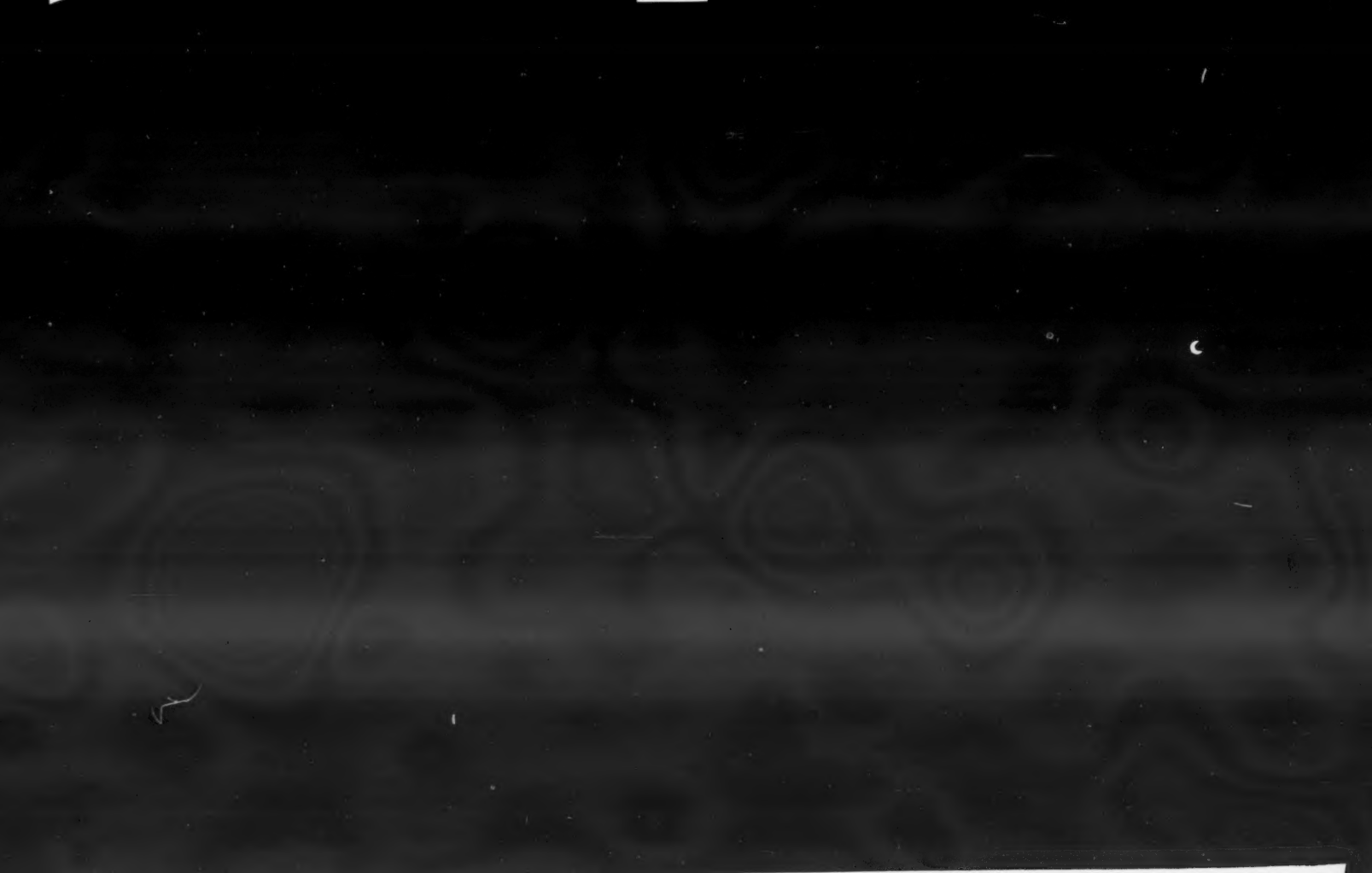


The
GEOGRAPHICAL JOURNAL

Vol LXXIII No 5 R.G.S. *May 1929*

JOURNEYS FROM MAJI, SOUTH-WEST ABYSSINIA

ARNOLD HODSON, C.M.G.

Lately H.B.M. Consul in South-West Abyssinia.

WE left Maji on 13 August 1923 for Southern Abyssinia. My route and those of subsequent journeys are shown on the map following p. 496. It soon led along the top of a high plateau. On the right-hand side we looked down sheer into the Kibish valley, while on the left are valleys and ranges extending as far as the Omo flats. In some parts the plateau thins to a narrow knife-edge. The views are magnificent in the extreme. We travelled along this knife-edge; then, passing Siski mountain, we eventually came to Adikas, where is a small Abyssinian settlement. Here there is a beautiful stretch of green turf, and a striking group of zigba trees. We had a very hot and trying climb down the abrupt descent into the plain below. At the bottom loads were changed over to the donkeys and I sent back the mules to Maji. The low country is unsuitable for mules as there are belts of tsetse fly, and, in addition, mule-sickness is prevalent. It must be realized that the changes in climate between the lowlands and highlands of Maji are extremely severe.

We trekked down through bush country and over open plains till we came to the lower reaches of the Kibish river, then quite dry although the Omo river to the east was in flood. We obtained water by digging in the sand-bed. Crossing and re-crossing the Kibish we reached in due course the Nakua mountains, called by the Abyssinians *Haet*, which means *Mouse*. The natives in this neighbourhood, called Bume, cultivate an enormous tract of alluvial soil irrigated by the flood waters of the Kibish. When the floods subside grain is planted, and the soil is so rich that the grain grows and ripens without any further water.

From there we trekked down to a Bume village on the Omo, just before the river enters the swamps which constitute the northern part of Lake Rudolf. The Bume here again cultivate the land irrigated by the flood waters of the Omo. The country is unhealthy, bleak, and absolutely open, with a few small stunted bushes scattered about at intervals. Low sand-dunes and shallow gullies add to the general depression. The heat was terrific and the glare bad, and by day a strong wind blew, carrying with it sand, which got into our eyes, food, and everything else. But the nights were worse, for the mosquitoes made life a misery.

The Omo at that point was broad and rapid, and full of crocodiles. Leaving the river, we skirted down the edge of the swamps, and passed a village just inside them called Gibe, belonging to the Gellaba—a wealthy people owning vast herds of stock in excellent condition. The natives are war-like, and armed with rifles, and are certainly a force to be reckoned with. I counted at least a hundred armed riflemen guarding the stock, and they could probably have produced another eight or nine hundred. They are continually raiding, and being raided by, the Turkana.

The Gellaba occupy the northern part of Lake Rudolf, between the Omo and Sanderson's Gulf, and northwards to the Nakua mountains, also the north-eastern shore of the lake as well. The Bume, who are similar to the Gellaba in appearance, are subject to them, and do the agricultural work, whilst the Gellaba look after the stock. Both are said to be brave and excellent fighting tribes. The Abyssinians therefore treat these people with great respect.

We travelled round the marshes till we reached the northernmost point of Sanderson's Gulf. There we turned to the west, passing several other Gellaba villages, and quantities of stock. Crossing Sanderson's Gulf, now composed of dry reeds, we followed up the Lomogol river, and found water by digging in its sandy bed. It was still very hot, but quite pleasant when compared to the country between the Omo and Sanderson's Gulf. Opposite us was a conical hill called Angmanang, where, a few years before, an engagement had taken place between our troops and the Abyssinians. North of Angmanang are the mountains called Garaguda, or Lorienatom, a favourite rendezvous for raiders.

We left the Lomogol, and travelled on towards Kalin, an important water-hole, thence making for the Nakalale river. We hoped to get water the first evening, but were disappointed. The guide assured us that we should get plenty of water the next morning in a dry river-bed called Kasiaguru. We went there, but when we arrived there was not even sufficient water for the men. Eventually, after following another false track, we reached Nakalale the next morning. There we saw an elderly woman who conducted us to the water-pits, which we should have had difficulty in finding without help.

I was told by one of my soldiers, who had been this way before, that the distance to our Post at Tarash, *i.e.* Kakumar, was only five hours on a riding mule. I therefore had something to eat, and set out with one of my men and a guide on the ride to Kakumar. At sunset I could see no sign of the station, and began to think the guide had lost his way. However I did not interfere, and eventually, at about 1 a.m., we saw the welcome lights of the station after twelve hours' actual travelling.

Kakumar camp is built on a small rocky hill by the dry river called Tarash. The heat there is great, and there is usually a strong wind, which blows about the sand, and makes things uncomfortable all round. Most of my poor men went down with malaria, contracted in that vile spot between the Omo and the Kibish. Some of them were new hands straight from the highlands of Abyssinia, and were always a ready prey to the anopheles mosquito.

The next point of my journey was Kakamari on the Uganda Escarpment which juts out into the low hot plains. When, after a few days, I climbed up

the escarpment, it was a pleasant change to feel cool bracing air once more. The rock formation in this part of the world is very striking, and obviously volcanic.

From Kakamari, after a few pleasant days, I travelled on towards Nagichet, first descending the western side of the escarpment towards the dry Kidepo river. We crossed the river-bed, passing on the way some hot springs, and once more ascended to the highlands of Dodinga in the Sudan. It was a stiff climb up the escarpment for my donkeys. Then on to the new station called Nagichet which the Sudan had recently started. The climate up there was bracing and very cold, and the juniper forests were magnificent. The camp is excellently laid out with several log huts which I had never seen before in Africa.

From Nagichet I went on to Taala, a military outpost perched right on the top of a volcanic peak, where subterranean rumblings are often heard—a wild and eerie spot. Beyond Taala we descended an even more precipitous path than the one up which we had climbed, and went on to a brackish water-hole called Narus. Thence we proceeded by a devious route over hills and dales till we reached Lolimi, a permanent water-hole in the Loyuro river.

The next day I was rather in a quandary as to what to do, for none of my men knew the route between Lolimi and Moru-a-Kippi, and the two guides, who had been detailed to come with me, had not appeared. I finally decided to make straight as the crow flies for the mountain of Moru-a-Kippi, which could be seen in the distance 55 miles away.

We left Lolimi, and trekked for a few hours down the dry river-bed on our way to Moru-a-Kippi. We had been told quite definitely by a native that we should find wells with a good supply of water at this spot. This would have been an enormous help in negotiating the long dry stretch in front. However, we found no wells nor any sign of them, and the animals had to be sent back to Lolimi to water that night.

The next day we left camp at about 1 p.m., and trekked hard till sunset, passing through numerous elephant tracks en route. We encountered some bad thorn-bush towards the end of the trek, but nothing seriously to delay us. We headed straight for the distant peak of Moru-a-Kippi, which appeared and disappeared owing to the lie of the country.

The following morning we left in the dark, and got on fairly well till we encountered thorn-bush, so thick and impenetrable that I had to send on cutting parties to hew a rough path for us. In this sort of country it is very difficult for the men bringing up the rear with tired animals to follow. I always take an old magazine with me, tear out a page, and, every 50 or 60 yards, stick it up in a tree. It is then quite easy for the men to follow and it gives confidence. There is in this dry and parched-up country a small soft-barked tree with pink blossoms, which I imagine must be related to the baobab tree. We trekked on till about 11 a.m., when we camped in a small open place in the thorn-bush. We went on the whole of that afternoon, travelling over plains, and then hewing our way through belts of thick thorn-bush, till in the evening we camped near two little hills which appeared to be quite close to Moru-a-Kippi.

The next morning we started off again. I thought that we were only about three hours from our destination, but it turned out that we were nearer eight.

I had gone on ahead with three men to reconnoitre the water, and came to a pool 98 yards in circumference, fed by an underground spring, and with gently sloping banks. We called the pool Mata Kachene (head of a giraffe), as there was a giraffe skull a few yards from it. Unfortunately, there is always some trial or other in Africa. All round, the grass, as dry as tinder, extended for miles, and a strong wind was blowing. The cook, in making a fire stupidly failed to clear a sufficient space, so that in a moment the veldt was ablaze. Every one seized branches and tried to beat out the flames, but the wind was so strong that we could not master them, although the camp was saved. It was a wonderful sight: the flames spread for miles and miles over the mountains and along the plain, and when night fell the ring of fire looked wonderfully beautiful in its steady advance, eating up everything in its way. Hawks skirted the ring of flame.

All around us was game in large quantities—zebra, literally in thousands, and giraffe; every night we heard lions roaring and grunting. We noticed here signs of a large Toposian party which had evidently recently passed through to raid the Turkana.

I had to press on for Maji. The route skirted the flanks of Moru-a-Kippi and then gradually ascended, passing through cup-like depressions among the hills. I should imagine that at one time most of this country had been under water—probably an extension of Lake Rudolf—the mountains being islands. It is admirably suited for stock, although now quite deserted. On approaching the Abyssinian boundary, the first mountain we saw was Tid. It is very conspicuous. Above this is another great mountain called Tomadur. I was very lucky on the return journey to Maji, and only lost two of my donkeys from snake-bites. On October 19 we were all glad to reach our headquarters again. We had visited the Kenya, Uganda, and Sudan outposts in the course of this journey.

My next journey was trying, though, at the beginning, all went well. I left Maji on 29 November 1923, to visit Pibor Post far to the west, and travelled down without any incident to Arat Ambo. Thence we travelled steadily on, leaving Moru-a-Kippi on our left, till we reached the Kuron river. This is a valuable tract of country, with succulent grasses suitable for stock. Leaving the Kuron we passed up the west side of the Boma plateau. The Abyssinians and natives often call it Murile. As we passed up north we gradually left the good grazing lands behind, and entered a country full of long coarse grass of no good to man or beast, except when, after burning, the green shoots spring up. This grass was very thick in parts, and so high that it made travelling extremely difficult and unpleasant.

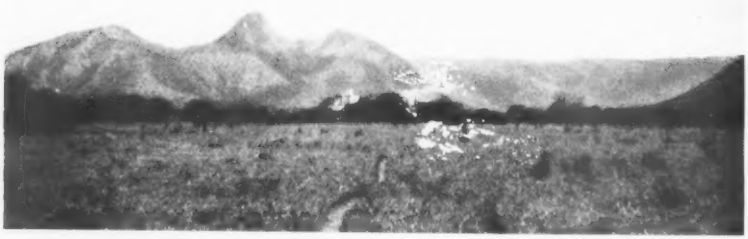
I had engaged a guide at Maji who professed to know the way from Boma to Pibor. Soon after we left Boma, I felt sure he was going too far to the north. He took us through dreadful country. There was no path, nor a vestige of one, and the grass was so long and coarse that we could see nothing. We went on like this for days, eventually coming to a broad river vlei, if that is the correct name. The river was about 100 yards across at this point, and a little way farther down it widened to 200 yards. It was from 3 to 4 feet deep, and full of long green rushes. I had to unload all my donkeys, and had the greatest

The Kuron river

The Gurafarda Range, from the Akula river

The Gila river near Outlook Mountain

Taba Seba, a conical hill in the Kibish river valley



Sentinel Rock, Tirma Mountain, from the east

Korma Mountain, near the Kibish river

difficu y in getting them through. Eventually we accomplished the crossing, and then followed the river-bank in a westerly direction. I gathered from the guide that we were now close to the Pibor Post. Our troubles however were only just beginning, as we found we had to cross several other broad vleis which entered the main river from that side. However, we progressed laboriously, unloading the caravan at each vlei, and man-handling the things across. The farther we went the more unattractive the country became.

That night we slept in a swamp, and the mosquitoes were appalling. The following morning we went on again, got into another swamp, and there I lost seven donkeys. The rest of my donkeys were too weak to go on, so I made a camp close by, under a big tree which I marked with seven large notches. The spot was then dry, but had obviously been recently under water. Our guide now insisted that we really were close to our destination, so I determined to push on at once with three mules of my own, and one belonging to my orderly. We left that spot about four in the afternoon and trekked through rushes, or rather long dry river grass, till 9 p.m., when we camped. Our guide, on being interrogated, was quite cheerful. "Oh yes," he said, "we shall be nearly there to-morrow." The next morning we started before dawn, and after an hour came to swamps with water about a foot deep. Through those we tramped for two hours, and then came to another channel about 60 yards broad. We plodded on, but soon after came to another river where the same wearisome performance had to be gone through. We went on once more over marshy ground, and very shortly came to yet another of the rivers; but this one was far deeper than any of the others, and we could not get the mules over. The guide then admitted he had lost himself.

The next day we turned back, losing one mule while crossing the second river, and reached our old camp. Afterwards, still retracing our steps, we eventually got out of the swamps. At the tree marked as I have described I left a note wrapped up in canvas, asking any one who might find it to let me know the locality of the place. I imagine it must be somewhere near the Kongkong river. I made a careful sketch of the route with a prismatic compass, as I thought the natives round Pibor would be able to place it. The swamp must be 15 to 20 miles broad in parts. I do not know whether rivers rise or end there.

We had a trying journey back to Boma, and after two days on the way the guide bolted. My system of putting paper in the trees was most useful. If it had not been for that, it would have been virtually impossible to retrace our way through the maze of elephant paths in the swamps.

We got back to the Boma plateau on the morning of January 8 and were fortunate enough to be able to persuade the local chief to exchange a bullock for some millet. He offered guides to take me to the Pibor Post, but as I was out of food and my transport was in a state of collapse, I decided to leave my caravan there, to push on with six rifles to Maji, where I would get fresh animals and food, and then return to my caravan and go on to Pibor. I explained my plan to the chief, who gave me guides to take me on to Meino, which is contiguous to, or really part of, the Boma plateau. Instead of going straight across, they took me in a semicircle around the edge of the plateau, and we passed through several small villages where we were warmly greeted.

Although it was the dry season, we were overtaken before we reached Meino by one of the worst storms I ever remember.

In due course we reached Meino. Meino is many miles within British territory, and this village was only about 6 miles from the last Boma village we had passed. I spent the heat of the day at Meino, surrounded at a respectable distance by a crowd of natives, fascinated by all my movements, especially when I shaved. They were of very fine physique, and had a stork-like habit of standing on one leg, with the foot of the other resting above the knee.

Meino is very fertile, and produces a large quantity of grain, and, until this raid, the natives owned large herds of cattle and sheep, so I am rather doubtful if tsetse fly really exists on the Boma plateau, as, in addition to the cattle, I had also seen goats there. Afterwards I found out that certain parts of Boma do contain tsetse, but it is not universal. The chief gave me a guide to take me on. He took us a few miles on our way and then disappeared. We were left in rather an unpleasant position till, by a great stroke of luck, we saw a native in a thick piece of bush, who acted in his place.

From Meino, after the descent from the plateau, the country became fairly flat and attractive. Going on through the deserted district of Logoda, we reached Tirmakara, which is an arena surrounded by mountains, and then Zilmamu. The scenery between Zilmamu and Maji was grand and magnificent, composed of beetling crags and precipices. In parts we traversed footpaths not more than 2 feet wide, with a sheer drop of thousands of feet below. The route was incredibly difficult to travel with pack-animals. We arrived at Maji on January 13.

After a short stay at Maji we returned to the Boma plateau by the same route. It was well that we knew the route, as, owing to the unsettled nature of the country, it would have been quite impossible to get guides. At Meino we were received in a friendly way by Losanga, the chief, and he gave us a guide to show us the direct route to Boma by way of Latilewan peak. I reached my camp on February 9 and found my men all right, with the exception of the headman, who had been very ill. I saw again the chief who gave me a guide in return for a bullock. Later, to prevent this guide absconding, I had to fasten him with a small dog-chain to one of my men.

We left Boma plateau the next morning, and, after passing through several small villages, we descended by a very steep route to the foot of the escarpment, and camped by a small stream, called Tigaro. We saw a large number of the biggest and ugliest baboons I have ever come across. We made a beeline for Pibor Post. The country was very flat, and covered in some parts by thick grass, although most of this had been burnt off. In the rains the country would be quite impassable, owing to the black cotton soil. On February 15 we reached the Nyate river. At this point it was about 60 yards broad, but not deep. All about this country were enormous numbers of white-eared cob. There was also much lion spoor, and we heard lions roaring every night At the river our guide's knowledge of the country appeared to cease, and I was considerably worried. Just before we were crossing the river, I saw two natives coming along the bank carrying a lot of fish. I took the men to my camp, and gave them beads and some cloth.

The next morning we crossed the river and, guided by the Beir native who had remained with us that night, we soon came to a village occupied by a large number of the same tribe. I interviewed the headman, and gave him a letter to send on to the officer at Pibor. He made a great many objections and, in fact, was distinctly unruly. In the end I paid him some beads, and he agreed to send the letter. Later on he showed greater obstinacy, but after a sharp encounter, despatched the letter. Continuing our journey we found that we had to cross another part of the river. It took us some time to do this as we were obliged to off-load all the animals and carry the stuff across while all the time crowds of Beir natives watched us without offering any assistance. We trekked on without further incident, and reached Pibor Post on February 19. Pibor Post is in a very low-lying country; in the rains it becomes an island in the midst of a huge swamp, and is sometimes flooded out.

I had originally intended to go direct to Mongalla to attend a Conference, but this was postponed. I therefore decided to follow the river down to Malakal on the Nile. I left Pibor on February 24 and travelled down the Pibor river towards Akobo Post, which I reached on March 6. All this country is very uninteresting, consisting of vast cotton-soil plains as far as the eye can see.

We stayed at Akobo Post for two or three days, and then went on to Nasir on the Sobat river. On the way we saw hundreds of men taking part in a great organized hunt. The Beir natives in the neighbourhood of the Pibor live to a large extent on fish. To attract these, they attach an empty melon to the end of a long stick, which they press down repeatedly into the mud. By so doing a kind of clucking noise is made which attracts the fish, and the natives then spear them. The Beirs also prepare large fences across the rivers, and when the waters decrease in the dry seasons, they stampede the fish, and catch them in the fences. On these occasions pelicans and other birds congregate in enormous numbers on the banks of the river to share in the booty. The Dinka natives around Nasir also spear fish in a very clever way. They have a long lance, to the end of which a barbed spear is loosely attached. To this spear is tied a cord, so that when the fish is pierced the head of the spear comes off and the fish is drawn up by the cord.

After the Beir country comes the Anuak district, then that of the Nuer, who live round about Nasir. Leaving Nasir, one passes through the country of the Dinka and Shilluks. The Anuaks or Yembo are a splendid race. They are of magnificent physique, quite different from the Nuer, whom I did not like. I arrived at Nasir on March 10 and spent only one day there. I had hoped to catch a steamer, but was disappointed, and there was nothing else to do but to travel down to Malakal on the Nile with our donkeys.

The actual travelling was not difficult as, of course, there was plenty of water, and, except for the cracks in the cotton soil, the route was easy, but the heat and the sickness during the last part of the journey caused us the greatest discomfort. My donkeys got tired, and all my men had fever. We embarked on one of the Nile steamers, and reached Mongalla on April 5. Our pleasant trip up the Nile thoroughly refreshed us after the long trek. We disembarked at Mongalla, and proceeded by road to Kitgum, where a conference on Border matters was being held. We had a very pleasant time here for a few days before proceeding to Entebbe, where we arrived on April 27.

After this I spent a few days in Uganda, and then went down to Nairobi, and, returning from there in due course, I reached Kitgum again on June 1, where I heard that my poor servant Takalu had died. We left Kitgum on June 2 and trekked through with porters to Kakamari, the most northerly Uganda outpost. I had managed, en route, to hire a bicycle. When we got to Rom, which is 44 miles from Kakamari, I decided to ride on ahead. I left Rom in the morning, and arrived at Kakamari in time for lunch. My men were there with the donkeys, and were delighted to see me again.

After a few days we left for Moru-a-Kippi, going up the Makonnen Cherosh river, then dry. The day we reached Tinin Ambo, a small hill four donkey-hours from Moru-a-Kippi, we thought we saw two men coming across the plain with bundles on their heads, but when they got nearer we found that they were not men but ostriches. There is only a rock pool at Tinin Ambo. A lot of lion drink there. We left about 2 p.m. On our way we passed through any amount of game—zebra, giraffe, eland, etc., and I noticed a new kind of hartebeeste, new at least to me.

Moru-a-Kippi—*i.e.* Hill of Water—is a vast mountain mass, full of valleys, some of which contain water, and there are as well numerous springs which form round pools, some of which are drinkable, while others are brack. Game, in consequence, come in their hundreds to drink here. Going astray in the dark, it was not until 10 p.m. (June 20), four hours late, that we reached our camp at Moru-a-Kippi. However, I found that my men and the mails had arrived that same evening. I stopped there for a day's lion shooting, which alas! proved a failure.

From Moru-a-Kippi we travelled on to Maji, which we reached on July 2. I stayed there for a few weeks.

I stopped at Maji until 23 July 1924, when I left to go to Jimma. The acting Governor of Maji, Fitaurari Mashesha, ordered fifty Government troops to escort me through the Tishana country. In the usual Abyssinian fashion, only five arrived. They were armed with antediluvian rifles, and had about ten cartridges each, but they turned out to be excellent fellows, full of pluck, and most useful. The caravan consisted of fifteen rifles, including two of my own.

The Tishana, as far as I could gather before I left, were quiet, and I did not anticipate any trouble. However, on the road I met some soldiers who told me that the tribe was in revolt again, and that in consequence the Post at Juma had been evacuated—Juma being situated in a district which probably has a worse name for brigandage than any other in the south-west. We arrived at Berchuma, or Golda, on July 31. I saw Fitaurari Mashesha as we passed through the town.

We then entered the Gemira Province and arrived at Shoa Gemira, the capital, the next day. The Governor, Dejazmatch Haida Mariam, with the usual crowd of soldiers, met me. He appeared to be hospitable and friendly, and sent the customary bullock and food to my camp.

The country now was very wet, and travelling on through Kafa the mud was really awful. Kafa province is one huge forest, a more watery spot I never struck. It was hilly, and the going ghastly. The bridge over the Gojeb river

was very rickety, and only one mule could cross at a time. The water was only a few inches below it, and the stream was rapid and dangerous. When the bridge is washed away, the only other means of getting across is by a tube-like, trellised construction, made of creepers strung across the river, and through which the natives crawl. It looked flimsy and unreliable.

The Gojeb runs down the valley between the mountains of Kafa and Jimma, and very beautiful the country is. The cloud effects in the rainy season are particularly impressive. As the sun comes out and the clouds roll away, heavy masses of vapour linger in the hollows, partly veiling the valley, like a battle-smoke reluctant to disperse. The lower slope of the mountains are not timbered, but higher up some of them are densely wooded. Through woods, too, runs the Gojeb river. Buffalo frequent the district, and water-fowl are plentiful.

The province of Jimma is extremely prosperous. The King, Aba Jiffar, obtained immunity from the Abyssinian menace by helping Menelik in his war with Kafa, the neighbouring province, and by the payment of a large annual tribute. All the Jimma people are followers of Islam. The country is well populated, and has been cultivated extensively. I have never seen a more fertile part of the world. The change, after passing through the devastated provinces of Gemira and Kafa, was most noticeable.

On August 16 we arrived at Jiran, the capital of Jimma. As we arrived on a Saturday, I wrote a letter to Aba Jiffar, the King of Jimma, telling him that I would call on him on the following Monday. The British Indians in Jiran gave me an excellent reception. A very large market is held every Thursday. Trade in the province is enormous. The town would be a beautiful spot were it under European supervision, but as it is it is untidy and dirty, even filthy, especially in the rainy season. Duck were very plentiful near my camp, so I was able to have a change of fare.

On August 31 we left Jimma to return to Maji. The route, owing to the mud and rain, was most unpleasant. The country was nearly all dense forest, overgrown and matted with vegetation. We could only keep to the path and plod along, wet to the middle, and bored and depressed in the extreme. We reached Shoa Gemira on September 20. I was again well received by Dejaz-match Haile Mariam, who was most kind. He wrote a special letter to Fitaurari Mashesha, who, as I have mentioned before, was stationed at Berchuma, telling him to give me a good escort on my way back to Juma.

We arrived at Berchuma on September 26. I was met by Fitaurari Mashe-sha, who was most polite. He followed me bareheaded to my camp, which was about an hour away on the other side of the town, and altogether he could not have treated me with more respect if I had been the Ras himself. He also took the trouble to send out food for all of us, which, from such a long distance, must have caused him considerable inconvenience.

Leaving Berchuma, we travelled through forest country, and then over open highlands till we reached Chabera, where there is a small post. We camped there for the night. It was the eve of the great Abyssinian feast of Maskal. My Abyssinians collected bunches of flowers, and tied them to long sticks, which they placed in the ground. I asked them the reason for these decorations, and they replied that they had made them in order that God

might be pleased and be kind to them. As the sun set all the men, two by two, arm-in-arm, with rifles over their shoulders, revolved around these sticks like dancing mice, singing a weird kind of chant, which was broken at intervals when they prostrated themselves and kissed the ground. Thus they danced and sang far into the night.

The next morning we went to Jana, a short trek through most beautiful country. The route lay along a knife-edge escarpment with valleys on either side. It was a nice morning, free from rain, and we all felt bright and cheerful. The Post at Jana is on the edge of the disturbed country. The soldiery there are continually engaged in skirmishes, by no means trifling, as their wounds prove. We camped in the only place possible, a small narrow clearing.

We left Jana early. I had intended to camp after three hours or so, to inspan at sunset, and pass through Juma at night. The route was overgrown, and the bush so thick that I could not find a suitable place for a halt, so willy-nilly we had to go on. I went ahead with about fifteen men. Twelve of them were Fitaurari Mashesha's men, and very good fellows they were. They were wretchedly clothed, and badly supplied with ammunition, some of their bandoliers being almost empty. This shortage of ammunition was very noticeable. It was probably accounted for by the fact that cartridges were so valuable, and so much sought after, that the soldiery habitually used them in purchasing what they required. Close behind us came the caravan. I suppose we numbered altogether thirty rifles. We reached Juma after six and a half hours, and, according to custom, we should have camped there. But I was not going to take the risk of being cornered in that place, so on we pushed to Musa, two and a half hours farther on, a much better spot to be in if there should happen to be trouble. Therefore, in broad daylight, and at a most unlikely hour, we got through while the Tishana were indulging in their afternoon siesta.

We arrived back at Maji on October 2. I was very well received, and all the chiefs seemed pleased to see me. I really believe that they were glad to have me there while they were engaged with the Tishana.

I found the Consulate in excellent condition. Lij Fikra Selassie, the new Governor, received me well. The act of King George in returning the Abyssinian Crown to the Empress, on the occasion of Ras Taffari's recent visit to England, had created a great impression in the south-west.

As soon as my animals were rested, and the Governor had returned, I meant to start for Turkana to discuss various matters with the officer in charge there. I expected to reach Nagichet in December to see the Sudan officials, and to hand over some mules I had bought on their behalf. Then, after returning to Maji, my intention was to proceed straight to Gore via Gurafarda in connection with the proposed new trade route.

On my way down to Turkana, while at Mukwetcha Waha, we encountered eleven scouts armed with fusil gras rifles, and with full bandoliers. I thought at first they indicated a Toposa raid, but, on getting into touch with the scouts, I found that they were Bume from the north of Lake Rudolf. They had made a large village on the Simbira river, which is situated north of Moru-a-Kippi, and were there with all their cattle. My relations with the Bume were quite

friendly, and their headman accompanied me for several hours. I was sorry to hear of this move, as I feared lest the Abyssinians might think that we had enticed these people down into our territory. I explained this to the Bume, pointing out that they were in a vulnerable position, and that I could offer them no protection, since they had moved there without the permission of the Sudan Government. I also pointed out that they were close to the Toposians, Jiwe, Boma plateau natives, and Swahili outlaws, and that, even if they were not raided by any of the above peoples, it was more than probable that the Abyssinians would send a force to drive them back. I advised them to return to their old haunts until the question of their nationality had been settled. It would be difficult to find a satisfactory solution to this problem of nationality, as half of them live on our side of the Kibish river and half on the Abyssinian side. These people are said to be good fighters, and were all armed with rifles. They are a branch of the Toposa tribe, as are their neighbours the Gellaba, and they speak the same language. They told me they were on friendly terms with the Toposa, Jiwe, Boma plateau natives, and Turkana.

On October 29 we reached the camping-place at Moru-a-Kippi, and from there we travelled on via Tinin Ambo to Mogila mountain, and thence down to Zingote mountain. There I left my caravan and went on to see the officers at Kakumar, which I reached on November 8. After a few days at Kakumar I left and rejoined my caravan at Zingote, and then pushed straight across by another route to Nagichet, where I arrived on November 19.

On November 26 I left Nagichet to return to Maji via Lubur and Lolimi. The O.C. Troops gave me some of the Equatorial troops to accompany me as far as Lolimi. I was much struck by their marching capacity. From Lolimi to Moru-a-Kippi we found no water. This time it took us twenty-five donkey hours' actual travelling. It was very hot, and the going was difficult, owing to the dense bush and the cracks in the cotton soil. Yet the donkeys were not unduly distressed. We travelled on and reached Maji on December 14. The Governor called on me as soon as I arrived, and was pleasant and amiable.

After a short stay at Maji, I left once more to try and open up a route to Gore in Western Abyssinia. We travelled to Shoa Gemira and then to Sire.

Leaving Sire, we travelled south of west through the forest country skirting the mountains of Gemira. Soon after leaving the village, we suddenly came on a narrow chasm, into which a stream abruptly disappeared, to reappear again shortly afterwards. The chasm was very deep. On a dark night it would have been the easiest thing in the world to walk right over the edge. All along the route I had been collecting butterflies, much to the amazement of the Abyssinians.

Near one of Muhammed Gran's pillars, the origin of which has never been explained, is the deserted village of Burtura, and a little later we came to the old Abyssinian town of Benesho. Nothing now is left of it but ruins, half covered in dense bush. Two solitary gum trees, strangely lonely and out of place, mark the site of the ancient church. The town was abandoned by Abyssinians on account of the Tishana peril.

At this point we left the heights of Shoa Gemira, and descended into the hilly valley running between the mountain mass which we had just crossed and the Shako mountains. Far away to the west the Gurafarda range also was clearly seen. The Shako mountains are not so high as the Shoa Gemira range, being about 5500 feet, whereas the highest peak in the Shoa Gemira mountains rises to about 9000 feet. We travelled up the valley towards Tamanjayage (5700 feet), the headquarters of Dejazmatch Taye, and the capital of Gemira.

Tamanjayage is on a small ridge, and enjoys a pleasant climate. This tract of country is occupied by the Bencha and Mori tribes, whilst north of Tamanjayage are the Dizu—all subsections of the Gemira tribe. I was told that the Bencha were inclined to be unruly, that they raided the Koina district in Shoa Gemira, and sold the natives whom they captured for rifles and ammunition. I noticed one striking peculiarity in the people hereabout—all their foreheads were disfigured by a cicatriced protuberance, caused, as I found out later, by their beating their heads with the sharp edges of spears when mourning their dead. Most of them were naked.

We left Tamanjayage on January 30. The first day out, towards evening, messengers came from the Dejazmatch bringing a dinner ready cooked and a bottle of champagne, with a letter saying that, as I had liked the food his cook had prepared for me at Tamanjayage, he thought it might be acceptable on the road. It was extremely kind of him to have thought of this.

We now travelled over the Shako range, passing round the high and conspicuous peak of Amoragadel, and reached the Customs gate of Kella at the foot of the mountain. Kella is close to the river Bako, which marks the boundary between the Dejazmatch's province and that of Ras Nado. Here Fitaurari Aria, Dejazmatch Taye's brother, who had accompanied me thus far, parted from me. The Bako is about 100 yards broad at this point. It is only about 2 feet deep, but the current in its rocky bed is so swift that, in crossing, we could keep our footing only with great difficulty. In the rains it is quite impassable. A short distance farther down it narrows to about 25 yards, and there the current is even stronger. At that point it could be easily bridged.

On the other side of the Bako we came to another Customs gate called Koricha, and from there we travelled over an extremely rich country, where I noticed a certain amount of cotton growing, till we came to the low hills of Yeki. The highest peak, Dubala by name, has an elevation of 4950 feet. Gurafarda mountains could be distinctly seen, and to my surprise I noticed several other ranges in between. At Yeki there is now a large settlement occupied by the soldiers of Ras Nado.

From Yeki we gradually ascended through thick forest over the top of the mountain range that juts out like a finger from the Kafa Province. Between Yeki and this range the descent to the lowlands of Masango on the west is gradual and uniform. Near the summit we passed a place called Gosh Kand, in olden times a sacred grove. The top of the spur is about 6000 feet high. After a slight descent to the Customs gate of Gamadura, we climbed once more up the steep mountain path leading to Anderacha Anderacha stands high—7000 feet—on the edge of an abrupt descent to the plain. The escarpment falls precipitously to the forest-covered lowlands that stretch away to the west.

Hill south of Tomadur Mountain

The Siski Mountains from the north

Arat Ber from the south

Hollow-backed hill south-west of Mukwetcha Waha

Arat Ber from the east

Amoragadel Mountain

This country is inhabited by the Mocha tribe. I have seldom seen a more interesting race. I should imagine that they must originally have come from Egypt. Gracefully built, with clean-cut features, they are in many cases as light skinned as the Mongolian races. They wear kilts made of fibre. All their drinking-vessels are made out of hollow bamboo. They also make nets of fibre. With these they cover large areas of forests and drive the game into them. Unfortunately, as I have said before, the erstwhile populous country is now almost completely devastated, and only a few of the original inhabitants are left. This part of Abyssinia is extraordinarily fertile, and will grow anything. There are no wet or dry seasons in the accepted sense. Rain falls every few days, so that the people can plant their crops when they like.

From Anderacha Gore lay to the north. Our route took us over high country, still covered with the same dense forest. We crossed en route the rivers Ganji and Baro, the bridges of which were both in a bad state of repair. All this forest country was depressing and not particularly healthy: the smallest scratch festered and turned into a sore which took a long time to heal. One noticed the absence of vultures and jackals and, indeed, of nearly all forms of animal life. The only animals I saw traces of were bush buck and wild pig. Insect life, on the contrary, was abundant, and I noticed many species of butterflies new to me. I caught several hundred butterflies, and sent them on to Professor Poulton at Oxford. Many of the natives in the province suffer from goitre.

We arrived at Gore on February 9 and left two days later, travelling down the same route until Koricha was reached. From Koricha we branched off from our previous route, and crossed the river Bako to Tirka. There Dejazmatch Taye came to meet me. Dejazmatch Taye is an interesting man, and was extremely anxious to help us with the proposed trade route from Gurafarda to Gambela, having the sense to realize that this would be of enormous value to his province. I stopped there a day, then said good-bye to the Dejazmatch and went on towards Gurafarda.

We crossed the Shako mountains, where there are several hot springs, and then descended to the Gacheb river, at this point a clear running stream of 20 yards broad. Then we ascended another small mountain range called Grine, on which there is a small Abyssinian village of the same name. Never have I seen anything to equal the poverty of these outposts. The escort given to me by Dejazmatch Taye, though under two officers of the rank of Kanyasmatch, were also clothed in rags.

From Grine I was anxious to turn back to the Bako to see the bridge I had heard so much about. Nobody there seemed to know who had built it or much about it, except that it was very large and that elephants continually passed over it. The natives called it Dildilla Waka, the Bridge of God. When I broached the idea to the officer in charge of my escort, he was much averse to my going.

The country was almost impassable, and a more unpleasant tract of forest I have seldom seen. Pushing through the bush, we found ourselves covered with small and ferocious ants, of a species new to me. My escort were silent and sulky, and it was obvious that they did not at all like the undertaking. At length we left the worst part of the forest behind us and, near the Bako, came

out into a country cut across by numerous deep ravines which in the rainy season must carry a vast volume of water to the river. The Abyssinian soldiers then announced that they did not know where the bridge was, and did not wish to go on, so I went forward with two of my own men. To get to the river was easier said than done. I found it to be a swift-running stream, probably from 30 to 40 yards broad, with many rocky pools. We followed it, wading upstream and clambered along its rocky banks, which in parts were quite precipitous. However, we continued our course, and eventually saw the bridge in front of us. Obviously it has been carved out in the course of centuries by the swift-flowing river forcing its way through the solid mass of limestone. The arch is nearly perfect. On the north side of the bridge was a precipitous bank 50 yards high That on the south is not so steep. The bridge is about 100 yards in length. Beneath it, natural walls jut out on either side, the torrent having forced its way through the narrow opening between. The river widens out just below into a large pool. The arch is quite flat on top, and elephants passing to and fro have beaten a broad path through the bushes growing there. We retraced our steps to our camp at Grine, which we reached at last, tired and hungry, with our clothing literally torn to shreds.

From there we crossed the Grine mountains, and then made our way over the valley of the Alanga towards the huge mountain mass of Gurafarda. "Gurafarda," in the Galla language, means "the Ears of a Horse." This range has been so named because, behind the extreme northern edge, is a mountain with two noticeable peaks, exactly like the ears of a horse. The Shako people call it Duka Dukas. I was fortunate enough to get many local names from an old Shako chief at Grine. There is a distinct resemblance between the Shako and Maji languages, but although I made careful inquiries I could not find any indication that these two tribes knew each other. It seems probable that the Maji tribe originally came from that neighbourhood.

The village of Gurafarda is situated on a small plateau 1 mile from the top of the mountain, at an elevation of 5750 feet, while the plateau at the top, just above, is 6250 feet. Behind the main mountain mass are three very distinct peaks called Komaka. Much to my surprise, I found that all this country abounded with elephants. At the village I learnt that the whole country had once been densely populated by the Shako tribe, then rich in cattle and other kinds of stock. The district now is completely desolate; I had not seen a single village in the neighbourhood. I found that Dejazmatch Taye had given orders for a house to be built for me.

Gurafarda itself is a large plateau covered with forests. At the southern end its average height is 7000 feet. It would be an excellent position for a town, which, in the event of the proposed Maji–Gambela trade-route proving successful, would become an important centre. All the trade in coffee, rubber, hides, and ivory would be brought from the south and south-west to this central market, and thence transported to meet the steamer at Gambela. Obstacles in the way would be the devastated condition of the district, and the numbers of brigands frequenting the neighbourhood. It is doubtful whether this country could ever be repopulated, but, with firm and just government, much might be accomplished.

Leaving Gurafarda, we travelled down the slopes of the plateau and, turning

southwards, reached a large dry river called Guracha, which enters the Akobo river. We blazed a tree at the junction. Once we had left Gurafarda my escort were obviously frightened of the Tishana, and I do not think that they would have been the slightest use if it had come to a fight—quite different from the Maji Abyssinians, who are really brave in bush-fighting.

I was greatly impressed by the Akobo. It is a delightful swift-running stream, about 20 yards broad. It rises below the town of Shoa Gemira, and is called many names by the Abyssinians, such as Bishan, Dima, Kaia, Waha, Ajuba, etc., etc.—all different names for "water." The neighbourhood is pleasant and apparently healthy.

From this point we had no guide who knew the road, so we trekked straight for Jaba. Our route first lay over open park-like country, and we then began to climb. Getting up the mountains of Jaba was the most difficult part of the whole journey, as there was no path through the thick bush, and the gradients were excessively steep and broken up by deep gullies. The mountain formation of Jaba is very interesting. It joins on to Beyru, which extends in a narrow ridge till the lowlands are reached. Just below Beyru are the mountains of Kolu, and below these the Duku. The mountains are very grand and magnificent. From Jaba we kept along the edge of the mountains to Beyru Customs gate. The Abyssinian in charge told me that the natives in the district had recently been raided by Tishana, that several had been killed, and many taken as slaves. All this country, like the rest of South-West Abyssinia, once well populated, has been completely denuded of its inhabitants.

We continued our way along the narrow ridge, and then, after dipping into the valley of the Kibish, climbed up the heights of Maji. Passing the Abyssinian Government compound on my way to the Consulate, I found the principal buildings in ruins. Nobody had taken the trouble to rebuild them, or to clear away the debris. It was a most depressing sight. I heard, too, that the village close by had been raided by Tishana the night before, and that all the inhabitants had been killed or carried off as slaves.

On 22 April 1925 I left again for Kakumar, following the same route as before via the Kibish valley, and thence to Kenya for a short visit. On my return journey I endeavoured to get a lorry through from Kitgum to Kakamari. The bridges en route, however, were not made for lorries; most of them collapsed after we had got over, and others broke down with our lorry in the middle. Finally, while still far from our destination, it stuck in a mud hole and completely broke down.

I left Maji on September 27 to proceed via the Boma plateau to Gambela, thence to Khartoum. Travelling via Adikas, we reached the Kuron just below Tomadur mountain on October 1. It was my intention to travel down the Kuron till it left the escarpment, and then to turn up sharp to the right till I reached Boma. I wanted to do this for two reasons: first to arrive in secret on the Boma plateau, and secondly to survey this part of the country in order to add it to my map. The Kuron had never been surveyed.

On the Kuron I found some of the Tirma people. They resemble the Maji

natives in appearance except that they have smaller and flatter noses. They told me they had fled from Damme to escape the oppression of the Abyssinians stationed there. All the Kuron country a few miles farther to the west is uninhabited and unknown. I climbed various hills and examined the country. A large plateau, with low hills here and there, was all that met the eye. Far away in the distance one could see the hills on the Boma plateau. The country appeared to be quite innocent and to offer no special difficulties; but never were appearances more deceptive. It turned out to be one of the most extraordinary I have ever travelled over.

The first part of the journey down the Kuron was not difficult. We found water in the pools, and the terrain was pleasant undulating country with ridges of low hills. The elevation was about 300 feet, and the bed of the river was 20 yards broad. On October 5 we passed the junction of the Cherosh Wonz and the Kuron. Here there were splendid rock pools which I should imagine never dried up. We caught some fish there which made a welcome change in our diet.

Shortly after passing the junction of the Cherosh Wonz and the Kuron the country changed completely. The Kuron now ran through a deep ravine with precipitous banks, while on either side mountainous plateaus rose 1000 feet higher. It looked exactly like a gigantic piece of dry dough with the river running through the crack. The farther we went the wilder the country became. We had been following the river-bed, which in parts was quite good going, and it seemed to tempt one on. Then the huge precipitous cliff-sides would draw together, and sometimes were so close that one could have thrown a pebble across. Forty or fifty feet up the cliff side one could see the remains of flood marks. I thought how easy it would be to dam the river here, and, with the water thus conserved, to irrigate the country lying to the north-west of Moru-a-Kippi.

Of course these rock barriers were quite impassable, and it meant that we had to wriggle somehow out of the river-bed and climb 1000 feet up over most difficult places, very steep and covered with boulders, and then wander about up there till we could find a way down again—a perilous proceeding, as we continually found ourselves held up by precipices. The last of the canyons was the most disastrous. We got caught late in the afternoon and could not get out, and then found that we were in a "fly belt." The Tsetse, after that arch-fiend the Serut, is the most painful of fly-bites, and it leaves a small swelling as if one had had a hypodermic injection. My poor donkeys were badly bitten, chiefly about the shoulders.

The ravine offered the finest buffalo shooting I had seen in Africa. I am sure that he dislikes other game, and I expect he goes for them too, for here there is nothing else but buffalo, although you would expect to find water-buck and other animals. I had noticed exactly the same thing in the impassable swamps to the north-west of Pibor, where one finds only elephant and buffalo. In fact there were buffalo everywhere, but, alas! where there are buffalo you nearly always find tsetse. I have never seen tsetse in Africa in places where there are no buffalo.

One of the peculiarities of this part of the Kuron valley is that it is impossible to follow the line of the river from the top of the plateau. Numerous

chasms join the main one, and from above you cannot see through which the river flows. I have named the chief "False Chasm," as it is quite impossible to see the real river course, which branches off at right angles until you are directly opposite the bend. The last crack through which the river emerges I have called the "Gate" on the accompanying map. The impassable, precipitous sides of the canyon now obliged us to make a detour, and we climbed to the higher levels on the north side of the river. They were wonderfully attractive, with splendid views all over the surrounding country. Then we descended again to a plateau 500 feet lower, strewn with great weather-beaten rocks. Thence we wended our way down again towards the river, and as we descended I saw, to my immense satisfaction, that we were approaching a more open country, interspersed with forests and glades. Before us lay a river of some size with thick wooded banks, flowing on to join the Kuron. We called it Junction River.

We got to the Kuron itself next day, after having to hack our way through the thick bush. The river here was broad, and there was water flowing in its sandy bed. Low hills bordered it on the southern side, and behind these was a higher plateau. For some time it had been raining nearly every day, and just here we had another heavy shower which brought the river down in spate. One more canyon blocked our way, but it was not nearly so deep, and we had not much difficulty in getting over a low hill which led down to it. We came now to another piece of open country, which continued to the west side of the escarpment. From the mouth of this opening the Kuron makes its way down a narrow valley bounded on each side by hills to the edge of the escarpment. We could see hartebeeste and zebra in the valley.

We outspanned near the hill marked N on the map, and I went on with one of my men to mount the hill. We were just climbing up the steep knife-edge when, from a forest about a mile away, a large mob of buffalo made their appearance and passed within a few hundred yards of us. I succeeded in shooting the leader, an old bull. From the top of Hill N (2300 feet) a fine view was obtained, especially towards the south, where we looked straight down a beautiful stretch of the Kuron, wending its way, bordered by forest, through the narrow valley between the mountains. In the plain beneath us to the west we noticed a rock (marked O on the map) shaped rather like a hen sitting on her nest; while beyond that we looked across the valley to another river, also bordered by trees, which entered the Kuron a little lower down. This was an important tributary, and I called it Buffalo River. To the south of Buffalo River, range after range of mountains rose one behind the other to the top of the opposite escarpment, which was considerably higher than that on our side.

We were now following the Buffalo River through pleasant country towards the hill marked Q on the map. It is like a giant ant-heap, and rises 400 feet above the ground around it, which has an altitude of 3600 feet. It lies in a nest of conical hills at the extreme edge of the mountain range which borders the southern side of the Boma plateau. This range is of strange formation, and is very conspicuous from a distance. On its eastern side are several peaks, towering up to 6000 feet, called Benjoni by the Boma natives, Biajono by others. In the middle, at an altitude of about 4500 feet, is a flat tableland

bearing no particular name, which gradually rises to a noticeable mountain on the extreme west of the range, from whose rounded summit there is at one point a precipitous descent to the lowlands below. This mountain is called Toron, and is 5700 feet high. On the north of the range there is a gradual slope to the Boma plateau, while the southern side descends abruptly to the lower level. The views from this range are superb. In the valley on the southern side of the range, tucked away in the escarpment far below, we saw the outlaw camp, consisting of eighteen huts. It has recently been deserted.

We crossed the central tableland of the range, and, going down the northern descent, reached a lower escarpment still part of the mountain range. This ridge skirts round Mount Toron in a semicircle at an altitude of 4000 feet, leaving the lower Boma plateau beneath on the right. Particularly noticeable from this spot are two outstanding rocky peaks, Galan some distance away to the north, and Latilewan close at hand. Latilewan rises from the lower plateau, not from the ridge, yet its top reaches well over the level of the escarpment. Towan peak, also grand and awe-inspiring, is on the top of the ridge. Its eastern slope is gradual, but on the western side is a sheer, indeed slightly concave, precipice. Enormous slabs of rock have fallen from it from time to time, and lie at its base. It stands right on the edge of the escarpment, and the route actually touches its precipitous face in passing by. Here I found some specimens of the new butterfly I had discovered in Gemira, and I delayed the caravan while I caught a few more, including a female.

There are a great many villages in this part of the plateau, and much cultivated land. There are also forests of good timber, and we passed several streams of crystal water. The route is quite passable for pack-donkeys. There are one or two steepish climbs, but really in this country I consider any route good if it has a path of any description. What kills men and animals is travelling over mountains or through forests and dense jungle, where there is no track, with the pace sometimes limited to half a mile an hour. It is impossible to describe how wearying and harassing that can be. In one stream I noticed many small broken branches. It puzzled me to know how they could have got there, till I found out that, whenever they cross it, the Boma natives will throw in small branches to bring them good luck.

I camped a quarter of a mile on the other side of Towan. On the west, with a cluster of small hills in the midst of it, is a broad valley which is important as containing the best route up to the Boma. One finds there a delightful spring which sometimes dries up. Another smaller valley running northwards gradually descends to the lowlands past Galan peak. On the east of this valley, the outer edge of the Boma plateau gradually rises to the higher land of Meino, which is itself part of the Boma, and is miles within British territory. From my camp at Towan, I could distinctly see the big tree at Meino about 10 miles away. The Boma plateau had always puzzled me, and it was only after I had paid it several visits, and travelled all over it, that I began to understand its formation. While at Towan I took many observations as far as I could see, especially to the north. I wished if possible to make a really accurate map.

The real owners of the plateau are those we call Boma natives. They are of the same tribe as the Beir, who are in the Pibor district, and the Dodinga, who

live round Nagichet, and speak the same language. The Boma inhabit the west and north of the plateau, and are known by sub-tribe names, such as Tete, Gigiman, etc. The Jiwe, a branch of the Turkana tribe, are emigrants from the lowlands around Kissiangore, having fled here from the Toposa menace. They speak the same language as the Turkana, and have the same customs. They reside chiefly in the Biajono mountains, to the south of the plateau. The Kachubo also live at Biajono. They are simply a branch of the large Tirma tribe. Finally there are the Meino, who are again another branch of the Tirma. So that on the Boma there are three distinct tribes only, speaking three different languages.

I found all these people looking very comfortable and prosperous—a great contrast to those tribes under Abyssinian control. There is no question but that they are on friendly terms with the outlaws and poachers. The latter supply them with meat—for which they would sell their souls—and in return are given grain, of which there is a large supply in the district. The Boma natives nearly all carry three long spears and some short stabbing spear as well. Their shields are very small and narrow, made of plaited sticks, and sometimes hide. They wear arm knives, some circular, and some sticking straight out, which are fastened around the wrist. Many wear their hair plaited in fantastic shapes, and some have belts of beads around the forehead, arranged in strips of red and white, 6 inches deep. Some of the young boys wear a feather in the centre of their hair, and two red flowers on each side, which look very picturesque. I have also seen a few men with small bells tied around their middles and knees. Most of the women have their lips distorted by circular pieces of wood of various sizes.

The Boma is a veritable Garden of Eden. I thought as I sat in the cool shades of the forests, watching the beautiful colobos monkeys disporting themselves in the trees, what a contrast it was to the hot, fly-infested lowlands, and also what a pity it was that we had no station there.

We left our camp at Towan on October 20, and descended the valley running northwards. I find that there is no river Ajibur, which, according to present-day maps, flows down this valley into the Akobo. In fact, owing to the watershed, it would be impossible for a river to flow in that direction. We crossed the Neubari river, which flows from the Boma plateau westward across the plains towards the southern end of the long straggling range called the Aligum hills, after passing which the Neubari turns northwards. One or two small tributaries flow into it after rain. Far away beyond the Aligum range, rising out of the plain, is a noticeable hill with a sharp peak, called Dim, and beyond that again another hill, by name Aguma. On our right a lower branch of the plateau swept round in an irregular semicircle, ending in a ragged range of hills much farther to the north. All this lower plateau is a confused jumble of hills and tablelands. It is in parts wooded, and, if the grass had been burnt, which of course was not possible at the time as it was damp, it would have been pleasant travelling.

Descending the plateau, we trekked through very long grass till we reached a strange kind of river 60 feet broad—I call it strange, because it was half river and half vlei, and appeared to have no current at all. The water was deep and crystal clear. We travelled up the vlei, making for the Akobo. To

our right a low range rose out of the valley, noticeable because of the ragged rocks at its southern end. Our route passed between this range and another low line of hills to the west. The elevation here is 2000 feet. Between the plateau and the Meino river, 400 feet lower, are fine spreading plains, wooded in parts. We skirted a mountain group called Mata, and descended to the level of the river—a muddy, stagnant stream about 30 yards in width. We crossed it above its junction with the Akobo, but, finding that we could not get across the Akobo itself at this point owing to the strong current, we retraced our steps and, crossing the Meino again, followed it until it joined the Akobo.

The Akobo is a splendid river, swift and deep, and bordered by a thick belt of trees. It is from 50 to 60 yards broad. We followed up the south bank, looking for a crossing-place, and travelled over the plain till we reached a hill by the river, called by the ivory poachers Munyongi. This hill is important, as I have fixed it by triangulation. The foot of the hill is 1600 feet and its top 1800 feet. Here we found a place where the river was fordable, being only 2 feet deep. We had a certain difficulty, owing to the steep banks, in getting out on the other side, but eventually discovered an easy place. On the northern side of the Akobo the going was quite good. Its banks were bordered by a dense belt of forest.

We now made for a low hill, which we afterwards called Observation Hill. Before reaching it, on the other side of the Akobo we saw a rock resembling in such a marked degree one of the Trafalgar Square lions that I named it "Sleeping Lion Rock." Observation Hill is 2000 feet high, and from the top the view is excellent. We looked over a vast expanse of plain to the Boma plateau. Here again Galan peak was plainly to be seen, and also, with the aid of glasses, Latilewan. An excellent road could be made from here, running straight as a die to the Boma. This would open up endless possibilities. Supplies could be run down the Akobo from Akobo Post, and then straight across to the Boma, with another road up to Gambela, and a branch in the middle to Gurafarda. From the top of Observation Hill we had a fine view of Gurafarda. The mountain at its extreme northern end runs south of west and then to the south, forming a big angle with the main range. Near the top of this mountain a low rugged range with a saw-like top runs out into the plain towards Observation Hill. The top of this is serrated, and valley after valley runs down precipitously to the plain. At the foot of the spur are several smaller ranges and isolated hills. I looked forward to getting round this northern spur later on in my journey in order to connect up my observations with the two "Ears" on Gurafarda, which I had mapped out on my last trip.

Shortly after leaving Observation Hill we came to a thick belt of timber which looked in the distance exactly as if it were concealing a large river running down into the Akobo, but, as a matter of fact, all we found was a shallow gully containing brack pools, evidently much used by game. After rain, of course, a stream would be running. A few miles after this, and parallel to it, we came to a splendid river called by the poachers Muton Ya Mowe, with a bed 240 feet in width, in which a swift crystal stream was flowing. This was about 60 feet wide, and when I first saw it I thought we had met our Waterloo, as the current was strong and it looked deep; but, as a

matter of fact, we found a place a little higher up only 3 feet deep, where we managed to get the animals across. On the far side the swamp bordering the river-bank extended for some distance. Though now dry, it was easy to see by the grass left up in the trees what an enormous volume of water must pour down in the rains. The river would then be at least a quarter of a mile broad, in parts 40 feet deep, and, owing to the swift current, utterly impassable.

We now travelled over pleasant country which would be delightful at the right season of the year—January to June—after the grass had been burnt. It consisted of wooded country, the trees as a rule being small, with a few tall ones here and there. Some of them were rather like our mulberry trees. Everywhere there was elephant spoor of recent date. The land was slightly undulating, and the going excellent. In fact, except for the grass, it was a perfect hunting-country.

There are many varieties of grass. There is the beautiful short turf you get in Abyssinia proper, and a pleasant kind of grass, about a foot high, such as grows in the Moru-a-Kippi terrain. But the grass that you encounter in this part of the world is very different from either of these. It has a kind of spear-headed seed which gets into everything, penetrates your clothing, and cuts the feet of your men and animals. It grows from 5 to 7 feet high, and one sees no game, so that the food question becomes serious. A fourth kind of grass, the very tall coarse variety, you find in the swamp-lands and in such parts as the country lying to the north-west of the Boma. In many places it grows over 12 feet high. This is a real hardship, as you go for days without seeing anything at all in the way of hills or landmarks. It is essential to have a step-ladder with you, and to mount it at intervals to get a look round. The heat is intolerable, and one feels buried alive. The last and worst grass of all is the long cutting rush found in certain parts of the country. It rises to a great height, and in some districts it is so high and so thick that the only way is to force a passage through. A man goes in front holding a strong stick before him with both hands. With this he throws himself forward on to the grass and beats it down, while a line of men following him trample it under with their feet, and thus clear a way. After the grass is burnt, the whole country changes and becomes then as pleasant as before it was vile.

All this country between the Akobo and Gila rivers is one huge forest extending as far as the eye can see, its level only broken here and there by low hills. Some of the hills are very small, but they were of inestimable importance to us as being the only means by which we could find our way at that time of year. Incredible as it may seem, we got within 200 yards of some of them and yet did not see them. The only way was to take prismatic bearings and to steer our course by compass till we came to a hill, then climb up and take another bearing. Travelling on through the same sort of country, we came to the swamps bordering the river called Tinga-Tinga—a poacher name. This is a shallow river, 18 feet broad, and has no perceptible current. Then we reached some small hills which I have called on my map "Elephant Hills." These I fixed by compass bearings.

We passed through several forests of bamboo, which I had not seen before in this country. The bamboos were very long, and about two or three times the thickness of an ordinary lance. Many of them had rotted at the base and

had fallen, impeding our progress, as they had either to be cut through or dragged aside.

The country is so wild and unknown that it is practically impossible to get guides. Two of the men with me had been up to the Gila previously with poaching parties, but owing to the grass and forest it is impossible to see anything, and they got hopelessly lost. In some of the worst places the grass must have been at least 10 feet high. Travelling now became very trying. For seventeen days we toiled through the tangled grass, averaging about a mile an hour. We could see nothing and we could shoot nothing, and in consequence the meat question became serious. Till we reached Junction Mountain there were no elephant paths, and I really thought I should go mad.

At last we reached Junction Mountain. I made the ascent, but not without some difficulty. I was able to get compass readings right on to the Boma, as well as Aligum, Dim, Aguma, etc. One hill called Tade, away to the north-west, with a noticeable spike at its point, I fixed by cross-bearing, noting that it would be useful later on to check our position when we should turn off north from the Gila. I had expected to see a large plain from here, with the Gila flowing through it, but instead found a wide semicircle of mountains rising to about 3000 feet extending from the Jingibil mountains right round to the west of Junction Mountain. There is therefore a long valley running from the north of Gurafarda to the Gila. To the north-west were many low hills. From the height on which we stood we traced the course of the rivers we had crossed during the last part of our journey. One of them, the Leman or bamboo river, a clear stream 18 feet broad, runs from the north-western edge of Gurafarda, while another starts from the eastern edge. The latter is a splendid river, with a swift stream 36 feet in breadth, the water being about 3 feet deep, and as clear as crystal. We called it the Jingibil river, as it rises near the Jingibil mountains. Between the Bamboo and the Jingibil is yet another river 20 feet broad, which however only runs after rains. These three rivers meet together just before reaching Junction Mountain—hence its name—and continue down in one stream to the Gila.

From Junction Mountain we took our last view of the Boma plateau and, descending to the plain, journeyed on towards the Gila. Between Junction Mountain and the Gila there were any amount of elephant, but the grass was too thick for me to do much. When we reached the Gila on November 5 it was in flood. It is a splendid river, 100 yards broad, and bordered by a belt of fine timber very different from the kind of forest through which we had been travelling. Some of the trees rose to a very great height, and to my joy there was no horrible grass, but only leaf mould, in this small belt. None of the men knew this country, and we had no guide of any sort. We travelled down the river-bank, and in the forest we saw a small Masango boy, who however, as soon as he caught sight of us, promptly fled. This was quite natural, as poachers or hunters invariably try to catch any people they see to sell as slaves, or, if they cannot catch them, they shoot them. When we left the belt of timber and turned off towards a range of mountains to the west, we came to the long grass again. We camped close to the hills.

The next morning I climbed Outlook Mountain (Apeya) 3100 feet high, and fixed it by cross-bearings on the "ears" of Gurafarda and Junction

Mountain. A magnificent view of the Gila, winding its way from slightly north of east, was obtained. At the foot of the mountain the Gila makes a sharp turn towards the north. In the afternoon we followed up its banks for a little, and I found to my surprise that it soon made another sharp turn, this time to the west, passing through a narrow gully in the mountains. As the rapids and precipitous banks were quite impassable for pack-animals, we had perforce to turn off and clamber over the mountains—a steep and difficult climb. We camped on the top for the night. A fine view was obtained from here of the north of Gurafarda and Junction Mountain. To the west one looked over another vast forest as far as the eye could see, the Gila here running slightly south of west. At the foot of the mountains were cultivated lands and a few villages. A quarter of a mile to the north there was a noticeable peak called Chogu, and from our camp to this peak we could see no break, nor any sign of the Gila river, though it was running between.

Early the next morning I sent out three men to try to get into touch with the inhabitants, while I accompanied the caravan. We had a difficult descent, but eventually reached the river again and camped on its banks. The difficulties of the route at this time of year can be imagined from the fact that it had taken us twenty days, with two treks a day, to do 123 miles! Soon my three men returned and reported that they had got into touch with the natives, who were Yembo (or Anuak). I finally got into touch with their chief, Fitaurari Abola, who agreed to provide me with guides to Gambela, and to ferry us across. We crossed next day after some excitement and more bargaining, with the loss of two donkeys. The river, from 60 to 70 yards broad, was in flood, and the current very swift.

I cannot understand why this tribe is called Anuak; they call themselves Yembo, and do not even know the other name. Nor have they, as I had always thought, a paramount chief or king. There are, in fact, many small chiefs, each independent of the other. Technically they are all under Ras Nado, even those south of the Gila, though these do not pay tribute to him. The Yembo informed me that they were not friendly with the Masango, and that when they could they captured their women and children. They seemed to have a good deal of respect for the Masango as fighters.

We left the Gila on November 10. The chief, Abola, was extremely helpful, and gave me guides and men to go with me, eighteen all told. I felt sure that we left a good impression on him, and that therefore he would be helpful and friendly to any other officer who should happen to go there.

The whole of the country between the Gila and Gambela, or, as the Yembo call it, Jajaba, is one vast forest, which may be divided into three varieties. First, there is the ordinary African bush of low trees, with here and there a few large trees and long coarse grass. Then great trees with wide-spreading branches, standing from 40 to 50 yards apart, with an undergrowth of long cutting grass, which cuts like a knife if you catch hold of it and draw it through your hand. And thirdly, there are dense forests of magnificent timber through which the sun never penetrates. One finds no grass there, only leaf mould.

Scattered about in the forests we came upon small Yembo villages, but this district is only very sparsely populated, and without guides there would be a

grave danger of getting hopelessly lost. The chiefs everywhere rendered me all possible assistance, and could not have been kinder. Of course, being able to speak their language helped me. I was also fortunate enough later on to find friendly Masango natives in the district just south of the Got river. They were living under the protection of the Yembo chief, Agua. I liked them immensely. There is no doubt but that the influence of the District Commissioner at Gambela is felt right down to the Gila; in fact, in their heart of hearts, all the Yambo think they are under him and not under the Abyssinians. Not one single Abyssinian official had I seen or heard of since I left Maji. They are frightened of the low country and its people.

Between the Gila and the Baro there is only one river of importance, and that is the Aloru, or Konkory, or Duma, which is navigable, I should imagine, right down to the Baro. It is about 40 yards broad, with a strongish current, and in the rains overflows its banks for about half a mile on either side. We had to swim the animals across.

These small Yembo sub-tribes are not all friendly to one another. For instance, Chief Kedi, when I passed his village, was preparing to attack Chief Kero, who lives on the Aloru to the west of Chief Gila's village. A few of them are in rebellion against the Abyssinian Government, and will not pay taxes. On the whole, however, they appear to be on amicable terms with the Abyssinians, who demand a certain amount of tribute from them to be sent up annually to Gore, and then leave them very much to themselves. These natives are mostly tall, slimly built, and wiry. Their huts are small, and shaped like a candle-extinguisher. The majority of the natives are armed with spears, but a large number of them carry fusil gras rifles, and some have rifles of modern calibre. They have very few cartridges, and are obviously no marksmen, as most of the back sights had been knocked off their rifles. In these thick forests, however, they would be extremely unpleasant customers to tackle. They cultivate a quantity of grain, but when travelling in the forests they are quite independent, as they live on a bulbous root which they dig up and which is plentiful. In addition they spear fish, of which they are very fond.

The last hills to be climbed were the Geme. That last journey was the most unpleasant I have ever had. We lost en route twenty-five donkeys and one mule, while the few animals that did reach Gambela died a few days afterwards. In the proper season it should offer no difficulties once a road were cut—an essential condition. A main road could be made direct to the Boma from Gambela, with a branch to Gurafarda. I feel sure that, from what I have heard, there is gold at Gurafarda and in the neighbourhood. This opens up interesting possibilities. The Abyssinian Government would have, of course, to appease the Masango, stop the brigandage around Gurafarda, and also have some proper form of administration ensuring protection to traders.

The day before we reached Gambela I sent on men with a note. My messengers arrived just as the steamer was tying up. This was fortunate, as if I had been a day later the steamer would have left, and I should have had to go down by canoe, instead of which I travelled in the greatest luxury. When I told my headman that I was going on leave, he burst into tears. I had never

known such a thing before. I went down the Baro, thence to Malakal on the Nile, where I took a steamer up to Khartoum.

My leave over, I left England to return to my post, and arrived at Gore via Khartoum and Gambela in December 1926. At the beginning of February I left for the south-west.

My route from Gore passed through forest country. Although hilly in parts it offered no difficulty, as a road had been cut through the trees. On either side lay a dense forest with green undergrowth, looking extraordinarily attractive and cool. Many of the trees were covered with creepers, amongst them sweet-smelling jessamine. I also noticed a small tree bearing a lovely red blossom, which is called by the Abyssinians *Arangama*. There were also many varieties of butterflies, always of interest to the entomologist. In due course we arrived at Anderacha, which is pleasantly situated on the top of a mountain.

We left Anderacha on February 7, reaching Gamadura Customs gate the same day. There I saw the local chief. He was much upset, as he had just returned from burying a trader who had been murdered by a local brigand called Mariam. This country is dangerous for small traders who travel by themselves, as it is all covered by dense forest. Close to Gamadura are several streams, and in one is a small and very beautiful waterfall. The Customs gate here is a regular trap. The country on each side, owing to ravines, is impassable, and the road passes through a long stockade, at each end of which is a strong wooden gate. When travellers enter by one gate, the gate at the other end is closed till all the taxes have been paid. At night both gates are securely fastened. We, of course, were not troubled in this way.

When I left Gore my intentions had been to proceed direct to Maji, but en route I received very urgent instructions by telegram to return to England as soon as possible to take up a new post. I therefore proceeded to cut straight across to Mongalla, via Gurafarda. I knew there was risk in taking this short cut, as the route between Gurafarda and the Boma, which entailed going straight over the middle of the Gurafarda range, had not been travelled before, and I did not know if it was practicable for pack-mules. However, I had no alternative as time was precious. I calculated roughly that if everything went right I should reach Lolimi between March 4–6, so I sent a telegram back to Gore asking the Sudan Government if they could send an escort to meet me at Lolimi about March 5. It was essential for me to go there, as I had arranged to do certain work for the Sudan Government in that neighbourhood.

On February 9 we reached Yeki. The *nagadie*, whose mules I had hired, gave me a good deal of bother, and I was heartily glad when I saw the last of him. We travelled on, and leaving Ras Nado's country arrived at Tamanjayage on my birthday, February 12. We approached Tamanjayage over a mountainous path, where I received the usual kind reception from Dejazmatch Taye.

I purchased a few more mules and started again on February 13 for Gurafarda. We travelled straight across from Tamanjayage to the hot springs. The road over the Shako mountain was not difficult. The country was wooded, and there were many beautiful valleys between the mountains. We

camped the first night at Shako village close by some streams, on a narrow ridge, on each side of which beautiful views extended. It was late when we arrived. The people of the village, bearing torches made out of fat and linen, were congregated together awaiting our arrival, and came to the camp bringing food. The procession was very picturesque.

On February 14 we arrived close to the hot springs. We crossed the Gacheb river, a beautiful swift-running stream. The Abyssinians, who are very keen on fish owing to their numerous fast-days, catch the fish in this river by grinding up the pods of a tree called Bira-Bira, and scattering the powder in the water. This has the effect of stupefying the fish.

It was just as well that I had mapped this part of this country on a previous occasion as, owing to the smoke by bush fires, the visibility was so bad that none of the mountains could be seen. We passed the small village of Grine, now deserted, and on February 17 reached Gurafarda village. From there I travelled up the mountain to the plateau at the top of the range. This plateau is composed of enormous forests, and the elevation is about 6000 feet. The range, a short distance to the north, is divided into two, and is not, as I thought before, one long range. Some streams flow towards the north and descend into the valley. Travelling across the plateau, we eventually reached a small Abyssinian outpost called Badika at 5100 feet. The route was more broken towards the end. From there we travelled down a very difficult and precipitous path to the plains below, which are, roughly speaking, 2500 feet. Thence through long grass towards the Akobo. We passed a short distance on our left the Aboukir river, a swift-running stream with a stony bed, which flows into the Akobo. It was about 30 feet broad. The Akobo at this point had very steep and precipitous banks, and it was difficult to find a way down them with pack-mules. The river was low and easy to cross. We had a good many trials to endure en route. There was no path, and on the way we lost the bullocks and ration sheep and some of the spare mules. In this country I always let my mules graze at night, and I usually tie their feet together with rope. If I had to travel again in Abyssinia I should import some good hobbles from Australia, as they would be extremely useful.

We left the Akobo on February 21 and travelled without any incident till we reached the Boma plateau. It was the hottest and worst time of the year in which to travel, and the country was extremely dry. Just below the Boma plateau, on the west side, there is a pool of water which I had always thought never dried, but now I found it as dry as a bone. Fortunately, on looking around the neighbourhood we found another pool. This was Wednesday, February 23. We trekked on in the afternoon and reached Morunimod, a noticeable conical hill, the next day. Here there is a strange spring, said never to dry up, though to look at it is only a small puddle. On this occasion it failed us, and again there was not enough water for my animals.

We left very early in the morning and travelled hard across a hot black cotton-soil plain towards the Kuron. I had hoped to find water in another rock pool, said to be permanent, on our left, but once more we were doomed to disappointment. We travelled very hard, and after a hot tiring journey reached the Kuron on February 25. But here again was no water. The mules, unused to the hot plains, were extremely thirsty, and they stampeded up and

down the river-bed and gave us a great deal of trouble. Eventually we found water many hours away to the west. It was a merciful thing that we did, as the mules were nearly mad with thirst. My animals were now so tired that I made a fresh camp here and discarded everything except bare necessities. I told the men to make their way back later to Maji.

We left the Kuron on February 26 and travelled over huge black cotton-soil plains. We crossed en route the bed of the Simbira. It is really wrong to call this a river, as it flattens out in so many places that it is quite impossible to distinguish it. Low hills vary the expanse of these plains, and giraffe are plentiful. We reached Kombo on the 27th. The water-holes at Kombo are situated in numerous rock pools, and it requires two people to water the animals—one to descend and hand up the water in a bucket to the other, who is on the top of the rock.

We left Kombo on February 27 at about 1 p.m. and, travelling over the neck of the mountain, came to a large plain. Far away in the distance I could see the Nachua mountains. In between us and them stretched a great plain of black cotton-soil, covered in parts by low forests and thorn bush, frightfully hot at this time of the year. Across this my guide was convinced he could lead my party, so on we trekked. The following day, however, after our supply of water had become very low and we had found no water-hole, the guide disappeared. In this difficult position I decided to camp while most of the men went back with the mules to Kombo to drink. I realized next day that it was foolish to break up my party, as none of the men knew the way back.

After waiting another day without any sign of the others, I determined to leave "Thirst Camp" and go back to Kombo with my two men. That night march through the thorn, with the constant fear of losing direction, was most trying, but by great good fortune we walked straight into the camp of the mule party near Kombo. They had lost the mule tracks and wandered off their course, but had eventually reached the water-holes, and were returning to find my camp. The hardships they had undergone were evident from their condition. Some had been over forty hours without water. In spite of all, I was determined to get through to Lolimi. By taking the strongest mules and reaching "Thirst Camp," 27 miles away, early in the morning, I hoped to be able to collect necessities and make a stage towards Lolimi before the sun was too hot.

Fortunately, we found "Thirst Camp" without further delay: here I sent back all the men except seven, whom I selected to accompany me for the remainder of the journey. We set out on a bearing for the Nachua mountains across bad thorn. That evening I had some trouble in persuading the men to continue, as they were tired and dispirited, but we reached the top of the Nachua mountains before outspanning. On our way we had crossed over many great game paths, all going south-east. My headman told me they led to the Lolimi. I felt I could not have made such an error, and determined not to follow these paths. Later a providential shower of rain fell.

The next morning all the men were fresh, the mules had had a good feed, the sun was clouding over, and in consequence travelling was quite cool. Had it rained harder it would have stopped us completely, because the black cotton-soil would have been impossible to travel over, and if I did not get on

to Lolimi at once the reliefs I was to meet there would return, and it would be very difficult for me to get on to the Nile.

We started off that morning in excellent spirits. I was still worried, for from the Nachua mountains where we were now I could see no landmarks in front that I knew, and I still had an uncomfortable feeling in my mind that the game paths we had passed might after all lead to Lolimi, but I came to the conclusion that I could not be so much out as I should be if Lolimi lay to the south-east. So we went on.

Nachua mountains at this point consisted of many small peaks, and it was very easy to travel between. After a time we got over the range, and then, to my inexpressible relief, all the hills I knew so well appeared in front of me. Lolimi was still a long way off, but the satisfaction in knowing I had come straight was so great that nothing else worried me. I started on again at two o'clock, but it was not until half-past seven in the evening that we reached Lolimi. The last part of the journey was very trying, as the sun came out and the thorn bush was very bad; but the mules came along splendidly, because by eating grass the night before they had got a little strength into their poor bodies.

Lolimi is a small rock pool in a dry river-bed. There is nothing so difficult to find as an isolated pool in a river-bed. The river bordered by great trees looks more or less all the same. If you miss the pool even by a mile, there is nothing to indicate whether you are above or below it. Again, very often before you come to the main branch you will find an equally large arm leaving the river, and it is very difficult to know which is the main branch and which is the arm. This was exactly what happened on this occasion. I guarded against the first danger by striking the Loyuro river, in which Lolimi pool is situated, many miles to the south, so that I was perfectly certain the pool lay to my right. But I did not know there was another arm which ran into the river below Lolimi, and on this occasion we struck the arm first, and my headman said that this arm was the main branch. I felt certain in my own mind that it was not, and we went on a few hundred yards, and soon found a proper river-bed. But it would have been very easy to have turned up the wrong arm, and in that event we should never have found the main pool in time to save the mules.

Eventually, to cut a long story short, we got to Lolimi, when our poor animals drank, and drank, and drank. Just before reaching Lolimi I noticed several figures on the top of the small hill. I looked through my glasses, and thought I saw the well-known equatorial battalion hats of the relief party I expected to meet me, but my men said that they were shiftas. I said to them: "Let us go up on the other side of the river and have a look before we go on to them." This we did, and to my great relief I saw that I was right. It was extraordinary that we should arrive at Lolimi on exactly the same day as the relief party and only a few hours later, on March 5, the exact day I had calculated.

To sum up, the distances on the last stage, as reckoned by a pedometer, were—from Kombo water-hole to "Thirst Camp," $33\frac{1}{2}$ miles in 13 hours; from "Thirst Camp" to camp on Nachua mountains, 23 miles in 8 hours; and from camp on Nachua mountains to Lolimi water-hole, $27\frac{1}{2}$ miles in $11\frac{1}{2}$ hours. I completed my journey via Lubur, Kapoeta, and Mongalla.

LETTERING ON MAPS; *A paper read at the Afternoon Meeting of the Society on 12 November 1928, by*

CAPT. J. G. WITHYCOMBE

FOR several reasons the subject of this paper is of peculiar importance at the present time. There is a great revival of interest in maps of all sorts, and especially in those decorative productions of the past which are being collected for the sake of their artistic qualities, of which the lettering is one of the chief. The great renaissance of typography and fine printing which has come about during the past twenty or thirty years again directs attention to lettering, whilst the change in methods of map reproduction calls for some changes in technique, and affords an opportunity to return to the traditional style which was lost during the eighteenth and nineteenth centuries.

Lettering has been very much neglected, and for a very long time cartographers have been contented to follow the conventions of the trade map-engravers, and yet the subject is one of great importance, for apart altogether from artistic considerations, the legibility and therefore the practical value of a map largely depends upon the writing used. Cartography, like every other craft, is based on tradition, and in order to improve the style of modern maps it is necessary to know something of the past history of the conventions we use. A careful study of the history and evolution of map making will repay every cartographer: it is because such study has been neglected that the productions to-day are as poor as they are.

Several influences have always been at work to mould the style of maps—the prevailing fashions in type design and handwriting, and the methods of reproduction used, amongst them. But map makers have always been slow to adopt new characters, and we find them using conventions long after the technical need for them has disappeared. Handwriting, type design, and engraving have all re-acted one on the other, and a thorough study of lettering on maps takes one very far afield.

From the sixteenth century until to-day three alphabets have been used on maps: (1) The Roman Capitals; (2) The Roman Text or "Lower Case"; and (3) The Italic. From the first of these the others have been derived, and in our Roman alphabet we still use the letters which were brought to perfection in Classical times. They were designed for cutting in stone, and the artists and craftsmen of the Renaissance went back to Roman inscriptions for their models. Leonardo da Vinci and Durer took infinite pains to design alphabets based on the classic letters, and the great type designers who followed them worked along the same lines. It was to Trajan's Column that they returned to study the perfection of Roman lettering, and we can still go back to it, in our turn, with advantage.

The Roman text or lower case used on our maps for names of moderate importance, such as village names, was based on the strokes of the reed or quill pen and derives from the monastic texts. It evolved from the classic Roman alphabet, and the letters took the forms with which we are so familiar by the simple process of being written quickly with a pen. The Italic alphabet in which most of the names on maps are written, and which was used in its pure form until the end of the eighteenth century, was directly derived from hand-

writing, the once fashionable pointed Italian hand. The Map engravers copied the hand-written script just as the early type designers did. Both the Roman text and the Italic were developed by calligraphers from the Roman alphabet, and afterwards adopted and modified by type designers and engravers.

From the latter part of the fifteenth century until well on in the nineteenth, the only method of map reproduction was engraving on metal plates. Before the introduction of map engraving on copper about 1480 wood blocks were used, but admirable as some of the woodcut maps are as works of art, they seem to us very archaic and crude attempts at map reproduction when compared with the results obtained by the metal engravers. By the middle of the sixteenth century copper had replaced wood, and for nearly two hundred years cartographers and map engravers were artist craftsmen who looked upon it as part of their duty to make their productions beautiful as well as accurate and practically serviceable. From the first they realized the importance and decorative possibilities of fine lettering. They took the alphabets I have described, which had been evolved by the penmen, and reproduced them on copper. The cartographers usually supplied the engravers with fair drawings which were copied stroke for stroke, and it was a long time before the tradition of the reed-pen writer was superseded; for nearly two hundred years engravers continued to imitate pen strokes with the Burin, and the old style Italic type was used until the end of the eighteenth century.

The map designers treated the Roman capitals with respect. These were carefully drawn and not freely written like the Italic and Roman texts. A looser and more calligraphic form of them was evolved which lent itself to decorative treatment; these "swash" letters, as they are called, were often adorned with flourishes which were obviously the work of the penmen. Names written in the swash letters were a characteristic feature of sixteenth and seventeenth century maps, and served, in company with mermaids, sea monsters, wild Indians, and ships in full sail, to fill the blank spaces.

In the latter half of the eighteenth century a change took place, and it was not a change for the better. The pointed Italian handwriting began to give place to the commercial round hand taught by the writing masters. This hand of the copy-books, with which we are all too familiar, is often called "copper plate," indicating that the engraver was beginning to set the style for the penman instead of copying him. The change can be followed very clearly on some of Isaac Taylor's county maps on which round hand replaced Italic, The introduction of steel pens enabled writers to imitate fine engraved lines very easily, and the ultimate result on our maps was the substitution of "stump" for Italic. The former is really a compromise between the flowing copper plate round hand and the authentic Italic script, and, so far as I know, its use has been entirely confined to maps.

This was not the only change which took place. Both the Roman capitals and lower case were modified, hair lines were introduced, and the proportions of the letters altered. The Roman alphabets were not only ruined æsthetically but as the degeneration proceeded they became less legible. In the case of the capitals, the letters became narrower in proportion to their height, the very fine hair lines and thickened down-strokes lost all relation to each other, and the serifs came to be so exaggerated that instead of emphasizing they con-

cealed the distinctive forms of the letters. Perhaps the lower case did not suffer quite so badly, but here, too, hair lines too thin to support the down-strokes were introduced, and the fine balance of the old letters was lost. The same influences were at work amongst type designers, and books as well as maps were printed in ugly illegible type until a world with impaired eyesight at last revolted against the final atrocities of the mid-Victorian printers and, returning to the sixteenth and seventeenth centuries, to Venice and Amsterdam for models, brought about the great revival of fine printing, the results of which we are enjoying to-day. The importance of this revival cannot be over-estimated. Book printers, advertisement and poster designers, architects, shop sign and facia writers have all gone back to the traditional style of lettering, but cartographers have been slow to abandon the convention of the engravers. There is a distinction between tradition and convention which has been well defined by Mr. Clive Bell. "Tradition," he says, "is the expression of accumulated experience, whilst conventions are no more than the tricks and habits of a recent past standardization for general use." The engraving conventions were undoubtedly useful standardizations for engravers; but the question we have to ask ourselves is: "Are these engravers' conventions still useful to us?"

The lettering on the earlier engraved maps of the Ordnance Survey is very fine. Although the style had altered, it still retained much of the spirit of the old cartographers, but gradually that influence has faded. The introduction of lithography made a great change; until well on in the nineteenth century the only medium for printing maps was the copper plate. The engraved copper plates were printed from direct, and the results were very fine indeed. Of course the process of printing was slow, and as soon as lithography came into general use it was adopted by map printers, who found that it was easy to transfer from their copper plates to stone and so avoid re-drawing, and to retain the copper plates as records. So it came about that engraving has been used for small-scale maps until quite recently. The last revision of the 1-inch map of England and Wales was carried out on engraved plates, and we still actually print sales editions from the copper plates of the 1-inch small sheet series and the Ordnance Survey map of the British Isles on the 1/1,000,000 scale. But, although it had a long respite, the copper plate as a means of map reproduction was doomed when lithography was discovered. It has recently been finally abolished on the Ordnance Survey and the Helio process has taken its place, as it is doing all over the world.

As long as great skill and care were used in transferring, and stone was the printing medium, the quality of the work obtained by transferring from copper was good, although it lacked the rich effect combined with clear definition which the direct print from copper afforded. Zinc plates gave less satisfactory results; the grained surface tended to break up the fine lines and to thicken the down-strokes, whilst the smaller white spaces in the letters were apt to fill up in printing. The introduction of colour gave rise to fresh difficulties. The engraved maps had been designed in black and white, and the imposition of strong colour on the roads upset the balance and often obscured the legibility of the names. However, the lettering remained on the plates as it always had been.

Now the situation has entirely changed. Heliozincography has set the draughtsman free from the limitations imposed by engraving. But we are very conservative creatures, and draughtsmen have not yet realized the possibilities which the Helio process opens for them. Having in the past drawn for engravers, they continue to copy the engravers' lettering, although it is even more unsuitable to the Helio process than it was for transferring. The very fine up-strokes which were the draughtsman's pride, besides being difficult to draw and spoiling the legibility of the writing, photograph very badly and need the expenditure of a great deal of labour on the negatives.

The Ordnance Survey is about to commence the revision of the 1-inch Map of England and Wales. The new map will be replotted and redrawn for reproduction by heliozincography. It is a great opportunity to restore the traditional style of lettering and decoration, which, as I have tried to show, has been degenerating steadily for the past 150 years. Before undertaking the task of designing a set of alphabets for Helio reproduction, it is well to be quite clear as to what qualities such alphabets should possess, but great care must be taken to guard against the reckless introduction of styles hitherto untried on maps, merely because they are easy to write and reproduce.

The essentials to aim at are, I think :

1. *Legibility*.—The letters must not only be legible when standing alone but also when superimposed upon the detail of a map.

2. *Suitability for reproduction by the photographic process which is to be used.*—The names should not need retouching on the negative, should go down easily on to the zinc plate, and should be free from any tendency to clog and thicken in rolling up.

3. *Good style and intrinsic decorative qualities*.—The style of the lettering on a map should be as good as that exhibited by the best founts of type in use by book printers. As legibility is one of the characteristics of every really good alphabet, the first aim will be attained if really good style is achieved.

4. *Distinction and contrast*.—Certain classes of names should be clearly distinguished and the different types of alphabets used and their gauge and spacing should achieve this.

5. *Harmony of effect*.—The alphabets appearing on any one map should harmonize with each other, with the detail of the map, and with the lettering and figures used in the margin for the title, imprints, references, and so on. This is a point which has been almost forgotten altogether. The more styles and sizes of writing that can be crammed on to a sheet the better pleased the designers seem to have been. The use of heavy block letters (known as Egyptian, but who knows why?)—and various other sans serif or grotesque characters, and even the sacred stump itself side by side with Roman, is bound to destroy the general effect and style of a map.

Keeping these points before us, we have tried to design a set of alphabets for small-scale maps reproduced by the helio process. Mr. Ellis Martin has made a careful study of lettering and type design, and these alphabets of his are based on the traditional characters which have been used on maps since the fifteenth century, but he has tried to adapt them to our special needs, I think with success.

Examining the Roman capitals first, the chief thing that strikes one is that

the proportion of the letters has been restored: during the nineteenth century the tendency was to make each letter fill about the same space, but the carver of Trajan's Column, Leonardo, Durer, and the medieval type designers are safer guides to follow than the printers of the early Victorian era, and the narrow S (based on two circles), the wide O, M, and W, together with a hundred other more subtle points, all make for legibility and beauty. The serifs give distinctive form to each letter without being too obtrusive. There is no violent contrast between the up and down strokes, and the former are stout enough to be easily seen from a distance. The white spaces within the letters are well designed. In a good alphabet these will always be beautiful shapes contained by harmoniously disposed curves; abrupt angles are avoided, and the containing lines flow smoothly into one another.

The lower-case alphabet which goes with these capitals is based on pen strokes. An effect of lightness and grace is obtained by the natural tapering of the strokes to a point instead of by a violent change from the thick downstroke to a hair line. Care has been taken to keep the enclosed white spaces simple and strong in shape and so to avoid clogging. So far we have followed the type designers pretty closely.

The Italic alphabet has been based on the traditional Italic alphabets but adapted to our special requirements. The old style Italic letters are very narrow, and beautiful as they are, they are apt to lack legibility on the map. The constricted form of the letters narrowed the white spaces, and these would be apt to clog and fill up on the zinc plate. Therefore Mr. Martin has produced a rounder and, I think, a more legible letter which, whilst avoiding the faults of stump, retains its virtues. There are no hair lines, and the mechanical horizontal serifs of stump which were quite out of keeping with the flowing character of the text have been replaced by curves. The distinctive form of the g and some other letters has been restored, and the letters are finished with a strong tapering stroke which will photograph and reproduce well, instead of with the curving copper-plate hair line which was characteristic of stump. The Italic capitals provide another distinctive alphabet, having the same characteristics as the Roman capitals. I have refrained from mentioning the Old English and Gothic texts. These are used for the names of antiquities on Ordnance Survey maps. They are difficult to draw and reproduce and their style is at variance with the Roman and Italic alphabets, but long use has rendered them indispensable to us. On the new maps they will be simplified as much as possible.

So far this paper has dealt with lettering engraved or written by hand on small-scale maps and on small-scale maps of a certain type: sheets of a national map executed in what may be called the grand style. Such a map calls for the greatest accuracy and fineness of execution, and a sense of accuracy and precision should be conveyed by the style of the lettering and can best be achieved by handwriting. Considerations of cost and time or lack of expert writers often make it necessary to resort to typing, but the principles which I have tried to make clear apply as well to type as to written lettering. Nowadays the choice of type faces is very wide. There are so many beautiful old style founts on the market that there is no excuse whatever for using the inferior ugly modern and sans serif faces which disfigure so many of the maps which

are being produced, both in this country and abroad. If care be taken, a set of alphabets possessing the characteristics which were postulated as essential can be selected, and these will approximate very closely to the written letters designed by Mr. Martin.

Type will never look as well as good writing, but good type is infinitely preferable to inferior handwritten lettering. It is sometimes possible to type the bulk of the names on the map (the less important names which appear for the most part in Stump and Roman lower case), and to write the fewer but more important and prominent names which are in Roman capitals and those where careful spacing and placing make it impossible to use type successfully. In this way the "hand made" look of the map can be preserved; but at least one expert writer is needed. The saving of time effected by the substitution of typing for writing is not as great as might be imagined, and the difficulty of training expert writers has been much exaggerated. Given a letter which can be formed by natural strokes of the pen, a little sound tuition and a really intelligent interest on the part of the draughtsman, and a writer can be made efficient almost as quickly as a typer.

Maps for reproduction by the helio process are usually drawn on a larger scale for reduction, and it is very necessary to consider the effect of reduction on the writing used. Each size of type is designed specially. An 8-point letter is designed as an 8-point letter; it is not a reduction of a 12-point or an enlargement of a 6-point character. If a 5-point alphabet is enlarged to say 10 point and compared with the 10-point alphabet of the same fount, the differences between the two will be seen to be very great. As the size gets smaller the letters must be wider and more open, the interior white spaces larger, and all the black portions thicker in proportion with less contrast between the up and down strokes, whilst the size of the serifs must be exaggerated. It must be remembered that the result of all this is to make the smaller alphabet the same in appearance as the larger.

It will be seen at once that any type face will suffer more or less from reduction, and it is better to have alphabets specially designed for reduction to the sizes which they will ultimately assume on the map. If this is impossible, letters on the wide, open, heavy side should be chosen for reduction, and of course the same principle applies to hand lettering. It is very difficult to persuade draughtsmen of this. They naturally take a pride in their work, and it is the appearance of the drawing and not that of the ultimate reproduction by which they are apt to judge their own achievement. It is fairly safe to say that a drawing which looks just right will not make a good reduction. There is another danger which a draughtsman who is proud of his writing is liable to fall into. He is often inclined to sacrifice detail to names. Of course this is a grave fault. The map is the important thing, and no name, however well written, should obscure or crowd out any feature which ought to be shown. It sometimes happens that a choice has to be made between an important name and a piece of detail. Such a case should be decided on its merits, but one's bias should always, I think, be in favour of making the map complete at the expense of the names.

The subject of Lettering is inseparable from that of general decoration, for writing is one of the chief factors which distinguish a fine map having a dis-

tinct æsthetic value from a mere diagram, which, however accurate it may be, makes no appeal to the imagination and rather offends than pleases the eye. There is no merit in ugliness, and, as I have tried to show, good lettering makes for legibility and efficiency, and this applies not only to the writing on the face of the map but also to that in the margins. The title, the arrangement of the scales and references and the characters used for these and the marginal notes and imprints are all important. Clear readable type, harmonizing with the map itself, should always be used and the marginal information should be grouped in such a way as to make reference easy, and to enhance the balance and general artistic effect of the sheet. The exuberance of decoration on some of the old maps was a fault, but we have gone too far in the other direction. A well-designed decorative border which sets off a map to advantage and the enclosure of the title, scales and references in cartouches, may actually help to make reference easy by guiding the eye to the information sought. Here again it is better to try to carry on and develop the tradition of the great map designers of the past than to try to invent something quite new or to apply decoration to maps which was originally intended for other uses. It is safest to take the strapwork map ornament of the sixteenth and seventeenth centuries and to modify it to fit modern requirements, carrying it further and developing it if we have the ability to do so.

I have said nothing about large-scale plans, but of course lettering on these is quite as important as that on topographical maps, and the same principles apply. There is a fine tradition to be followed here too, for many of the seventeenth-century estate plans are very beautifully executed and they repay careful study. Recently the old style letters have been introduced into the Ordnance Survey 25-inch plans with success, and a better balance of weight between names and detail is being aimed at.

Much has been done during recent years outside the Ordnance Survey to improve the style of maps by a return to the traditions of the past, but the problems of a National Survey are peculiar to themselves, and the freedom of style and experiments in decorative lettering, which can be used with effect on single sheets or maps illustrating books and journals, would be out of place on a series of official maps. If we adhere to the best Roman and Italic types, and adapt them intelligently to the requirements of our reproductive technique, I think we shall find that we have carried the art of cartography a step forward, and it may even be possible to bring about a revival of fine map-making comparable to that which we have seen in the sphere of book-printing and typography.

DISCUSSION

Before the paper the CHAIRMAN (Admiral Sir WILLIAM GOODENOUGH) said: I have great pleasure in introducing to you Captain Withycombe of the Ordnance Survey, who will lecture on "Lettering on Maps."

Captain Withycombe then read the paper printed above, and a discussion followed.

Colonel WINTERBOTHAM: I think that map-makers in England and throughout the Empire will feel that they owe a considerable debt of gratitude to Brigadier Jack and his staff. The question of lettering on maps is a burning one, and I can illustrate it no better than by telling you that every small letter that we have

recently drawn on our War Office maps has been costing us an additional threepence to cut clear on the subsequent negative because it is written in a style which is not proper to modern photo-mechanical method. The alphabets now provided are pleasing, and if there are remarks to make they are only on minor detail. It is, no doubt, largely a question of individual taste.

Captain Withycombe has referred to Trajan's Column and to the benefit we should derive by a return to early times. One feels rather a vandal in suggesting that possibly the twentieth-century Englishman may, on occasion, letter as well as an early Roman. I would not like to press the point, but there may be some who would agree with me. Taking one or two of his letters in detail, there are some that are not quite convincing. There is about the letter "C" a certain Teutonic amplitude which is certainly not familiar, and I am not sure I quite like it. Contrast it with the elegance and female slimness of the E's, S's, and B's. If we are to hark back to the past, I have no objection so long as we retain only what is really useful; but I would not like, on my own maps, to introduce little twirligigs between the *s*'s and *t*'s as is done in the alphabet exhibited; nor do the *ffi*'s or *l*'s of the Italic seem to me clear and legible to the modern eye. They remind one rather of those *s*'s one used to find in old-fashioned books of carols that certainly went with the spirit of a festive Christmas though unsuitable for a map. If one wants to be artistic in map-making I think one must remember that the art of lettering is to make it so neat and unobtrusive as not to absorb attention. Names are given to signify something in the topographical sense. I do not think one would wish to make a J or K so distinctive as to draw the eye as, for example, would a man in Bond Street in pink trousers.

With these few remarks let me add again that I think the alphabets are a real advance, that they have been employed already in certain War Office maps, and that all will join in being grateful to Brigadier Jack and his staff for giving us so handsome a lead.

Brigadier E. M. Jack: Colonel Winterbotham, having made his criticisms, has gone! There is one small point I might mention. Captain Withycombe spoke of the helio process, and it is possible some may not know what he meant. It is the reproduction of a map by photography. It is possible to draw the map, write freely on it and photograph it. Our old method of map production was by engraving on the copper plate. The difference is between the use of the graver and the use of the pen; that is to say, the introduction of heliozincography enables one to use the pen freely, as in old days.

Captain Withycombe mentioned that the Ordnance Survey were following type design rather than writing, whereas the Royal Geographical Society had been following writing. There is a very good reason for the Ordnance Survey following type design: we have to use type largely, whereas the small maps and plans reproduced in the Society's *Journal* can be done entirely by writing. The Ordnance Survey is bound to use a great deal of type; it is used a good deal on small-scale maps and almost exclusively on large-scale maps. So that we are committed to type and therefore it is quite right for us to follow type design. As Captain Withycombe pointed out, there are many beautiful type designs, and we are trying to get both our writing and type back to the old standard of beauty. In fact, that is generally our policy now on the Ordnance Survey. We are trying to restore, as far as possible, the beauty of the map without in any way impairing its clearness or its usefulness. I think you will see examples of the beginning of that in some of our recent maps. Take the new edition of the map of Roman Britain. The border, to begin with that, has nothing to do with writing, but the mere addition of that very pleasing border has made an extraordinary difference to the appearance of the map. If you examine some of the

writing and the numbers for latitude and longitude you will find the lettering very pleasing. There are many improvements to be made yet, but we are, I hope, making a beginning. If you compare the second edition with the first you will see a great difference in the border and also in the names. Of course, as Captain Withycombe said, we have our great opportunity in the new edition of the 1-inch map of England which we shall be commencing shortly. We are going to try and make it, as much as is in our power, beautiful and at the same time just as clear and good as the old engraved 1-inch.

There is no more I can say, except that I am very grateful to Captain Withycombe for the work he has done. I think we are extraordinarily fortunate in having him in charge of this work, because he is an artist by profession and by nature, in addition to being a surveyor. We also owe a great debt to Mr. Martin, who has put a great deal of thought into his work, and without thought no amount of work is of any value.

Mr. REEVES: A great deal of the good resulting from discussions of this kind would be lost if those who take part in them were not at liberty to state freely what they honestly think about the matter under consideration, which is what I must try to do this afternoon, although I regret to have to disagree from some whose judgment I greatly respect; and am especially sorry to differ from my honoured chief, our secretary, Mr. Hinks.

This subject of the "Lettering on Maps" is an important one, and over thirty years ago I remember its coming before the Society, with the result that a specimen sheet of styles of writing to be used on maps was printed and served as our guide for years afterwards. Then came the specimen sheet of lettering for the 1/M International Map of the World, which, with certain modifications, has been followed until recently in maps drawn by the Society's draughtsmen. This was the final outcome of much deliberation by an international committee, and it seems to me to be a serious matter to set it aside.

The necessity of having any names at all on a map is to be regretted, for next to accuracy, clearness is the important thing; and it must be admitted that the physical features and topographical details are seriously interfered with by covering the map with place-names. Still, since names there must be, care should be taken to see that they do not obscure the map more than can be helped. They should be as plainly and concisely written as possible, with no unnecessary ornamental decorations or flourishes. We do not want to attract attention to the names, but to the map features.

Although it may be all right on engineers' plans, and sketch-maps for page blocks with few names, I consider that writing with flourishes or "swank" or "swash" letters, or whatever they are called, would be altogether out of place on small-scale maps with many names and full of detail, such for instance as a good atlas sheet. On such maps the names must be as small as is possible with legibility, and there is no space to spare for unnecessary flourishes. I say this especially because it is proposed to use ornamental lettering, not only for the names on sketch block maps, but on others for which I believe it to be quite unsuitable and impossible.

While it is doubtless true, as Captain Withycombe states, that map draughtsmen have at times in past years got into bad ways with regard to lettering, yet on the whole is it not the case that the writing of names, like all other branches of cartography, has gradually evolved from crude beginnings to what has been found to be generally most suitable for the purpose; and that the lettering on the best type of map of the present day is a sort of "survival of the fittest"? Take, for instance, many of the maps published by the Geographical Section of the War Office, those of the Colonial Survey Departments, the maps of good atlases

of recent years, or some of this Society's best folding maps in the *Geographical Journal;* it seems to me that in these little more can be desired in the way of clear and well-written names. As pointed out in the paper and shown in the bad examples exhibited by Captain Withycombe, the chief faults of the so-called "stump" writing are that the serifs are frequently too long, and tend to run into one another, and the fine hair lines are too thin and the down strokes too thick; but these faults are due to the writing being badly done, and have nothing to do with the style of writing itself.

Things are not necessarily best because they are old, and I fail to see why we should go back to Trajan's Column with its disproportionate letters, some fat and others thin, for good examples of our capitals; nor do I see why, because in early days italics were written in an ugly pointed style, followed afterwards by our grandparents, we should imitate this on our maps to-day. The modified forms of this lettering Captain Withycombe proposes to use on the new Ordnance Survey map is, of course, a great improvement on these early types, at any rate so far as maps are concerned, but I believe they will not be found so clear and generally suitable as the best styles of writing on former Ordnance Survey maps, especially for the smaller names, and will occupy more space.

To have all the names on a map in one kind of writing is, I feel sure, a great mistake. Of course, a needless multiplicity of styles is objectionable; but to my mind nothing helps more to render a map clear and legible than to have different styles of writing for different features. For instance, in a map of Central Africa or Asia, to prevent confusion it is most important that the same style of writing should not be used for districts as for tribes, ancient sites again should be written in another style, and the names of mountain ranges and peaks, particularly when there is nothing but the name to indicate their direction and position, should be written in a special type, and for this purpose, in spite of all that has been said to the contrary, I believe the most suitable to be the Egyptian or block letter. It is compact and has a suggestion of solidity about it that is very appropriate.

We must not spoil the general clearness and utility of a map for the sake of some supposed artistic effect, which after all is a matter of opinion and taste.

Names printed from set-up type instead of being written are as a rule unsatisfactory. They are too rigid and run roughshod over all physical features; whereas written names are more pliable, and with a little care can be arranged so as to avoid covering up important details.

Finally, as regards borders. For my part, and I know many agree with me, there is nothing better for any map than a simple, restrained, and well-drawn line border, such as we have been accustomed to; but whatever may be said about elaborate ornamental borders for large maps, I feel sure it is a great mistake to surround a small block map measuring say about 4 inches, by a broad and elaborate border. In my opinion it frequently gives the map a ridiculous appearance, besides which it takes up space which could be much better utilized by having the map on a larger scale.

Mr. HINKS: You will perceive that my excellent colleague and old friend, Mr. Reeves, is a Die Hard; and any one who tries to introduce considerable reforms, as he supposes they may be, into the maps produced by the Society has an uphill task before him. Nevertheless, you will see on the screen some specimens of work done by our junior draughtsmen, more or less, you may say, at my instigation, and you will have noticed that in the *Journal* of recent years a style of map-drawing has been used which contrasts very forcibly and vividly with the style of map produced, under Mr. Reeves' care, by our senior draughtsmen. So that we are at present in the interesting position of having two schools of thought

in this Society: one represented by those who have been here long in the Map Department and who are wedded to the style which Mr. Reeves remarks was laid down some thirty years ago, and the other represented by those who have been less long in the Society—I for about fifteen years and my junior draughtsmen for periods ranging from two years to eighteen months. What we may call the junior branch is at present experimenting.

It was a first principle, when I started thinking out how the appearance of our maps could be improved, to get away from what I am bound to feel was an extreme mistake made by the Committee on the International Map. Mr. Reeves considers that their pattern should be taken as sacred. I do not, and if only for this reason: that it was the result of the consideration of an International Committee. If you think what would happen if you set an International Committee to paint a picture you will, perhaps, be inclined to agree with me that an International Committee is not necessarily the best body to get a harmonious and consistent style of map-drawing. Naturally every one likes to have a bright idea and to distinguish some particular feature by a new style of letter. Consequently, there are in the specimen sheet of the International map something like twelve or fourteen entirely discordant characters. What I feel most strongly is that one should never use that style of letter which is called, for no reason at all, Egyptian—the solid block lettering—for physical features like ranges of mountains. I was sorry to see in the characteristic sheet of the new 1-inch map of England which, in many respects, marks extraordinary improvement, that Captain Withycombe has allowed that style of lettering for hills.

It is maintained by Mr. Reeves and other friends that you must try to distinguish the different features by different styles of lettering. Those of us who differ from him maintain, on the other hand, that if the map is drawn properly it is obvious when the name belongs to river or hill, and there is no need to alter the style of lettering for that, any more than there is necessity during the course of a novel to alter type for a pathetic passage or to have larger capitals for the heroic episodes. It is not artistic and not necessary. That is, however, a question we shall hardly ever be likely to agree upon.

Let me come to details. Some time ago the Society had the great good fortune to acquire the Hondius map, and, looking at its style of engraving, it appeared to me that nothing more beautiful had ever been done. I do not think that it was necessarily the method of Hondius; he was an admirable engraver, but I believe his engraved letter was based upon the best penmanship of the time, and that it is a mistake to say that we cannot now imitate by writing, and get an effect equal to the Hondius letter, because Hondius was a copper-plate engraver. I believe you can argue in a circle, as Captain Withycombe has pointed out. It is said that Trajan's Column contains the most perfect monumental lettering, but there seems to be every reason to argue that the letters were really cut from pen designs. The character of those letters belongs to the pen, and I maintain that the character of Hondius belongs to the pen too, although so beautifully engraved on copper.

We have tried to develop for the Society's work a style of lettering based upon the map of Hondius, and I should like, very briefly, to put a few slides upon the screen. You will see Captain Withycombe's idea and Mr. Ellis Martin's idea of the best type of italic for the map. Some of my youthful draughtsmen have rather rapidly made a specimen which has certain considerable differences from the style of the Ordnance Survey, due to the fact that the Ordnance Survey use steel pens whereas our draughtsmen use quills. The disadvantage of using pens is that you have to draw. When you want a thick stroke you put a fine line and another parallel to it and then fill up between the two, and you do about a fifth

of the number of names during an hour that you do when using a quill. It seemed to me one of the essentials of my scheme to get something that could be done rapidly. Certainly the work of the Society's junior draughtsmen has produced some very rapid results. You will see two attempts by some of my junior colleagues to write the names upon the Ordnance Survey specimen types in the style of the Hondius Italic, and I quite humbly submit to the Director-General of the Ordnance Survey and his staff that that style of Italic is, on the whole, more legible as well as being considerably easier to draw than the style which has been submitted in the very interesting sheet before us. When you get up to the Roman capitals, of course the biggest must be built up, and there is not so much difference, but the small ones are done by single strokes of the quill instead of multiple strokes of the pen. That is a point that has to be borne in mind as very important. The use of the quill enables one to make very good Roman capitals indeed, but of course produces a slightly different shape of serif.

In the Roman alphabet designed by one of our draughtsmen for making up with the quill the last two letters show how the serifs are formed; and how the letter is built up and then filled in, the idea being that each thick stroke is made of three thicknesses of the quill.

Then we come to what Mr. Reeves has so happily miscalled the "swank" capitals—a delightful expression. I think it is a mistake to suppose that anybody wants to swank with those capitals when the map is crowded, but they have the advantage over the ordinary capitals that the Arabic has over the Roman. You know that when the Turk wants to write "Turkey in Asia" he writes it right across the map, and that is exactly how the seventeenth century used the "swash" capitals. When you want to carry a name across you do the "swanking"; when you do not, you keep yourself compressed just as before. This style of lettering lends itself to rapid work.

The next picture shows characteristic signs which were lettered up very rapidly indeed without any laying out in pencil. One gets the line, not of course as carefully as would be given in a finished map but, at the same time, I maintain quite good enough for a great deal of sketch-map work such as is used in newspapers and books, which can be done in this style of lettering very much quicker than any other.

For about eighteen months or two years now we have had all the line blocks in the *Journal* done in this style, and though I am far from saying that we have arrived at anything like perfection, there are certain points about it. Let me show you a map which has not yet been reproduced in the *Journal* but which was used at the lecture on Monday last. The map contains about one hundred names. It was, of course, sketched out in pencil first, but the hundred names were written in a day, and I venture to think that in the built-up system of the Ordnance Survey they could not have written one hundred names in a day. I do not say the mechanical production is as good as the Ordnance Survey would have achieved, but I maintain that there is a certain freedom and pleasing character about it which is better than the Ordnance Survey achieve. At any rate, it is more useful for putting in blocks in the text when illustrating books. I am not prepared to say it is more useful for a highly finished map. The map shows what I was remarking: that if you want to write a mountain name, for instance the Qarliq Tagh, it can be written just as well in that style of capital, and there can be no doubt that you mean, in that case, a mountain.

In the next slide you see how well the Italic lends itself to the curved names along rivers. No one maintains that that river name ought to be written in a totally different style of Italic from the others, and it seems to me that if they do not maintain that they can hardly expect us to agree that the mountains must be.

One of the points in which we are likely to go wrong from want of technical experience is in the question of filling up in printing, and from time to time I have noticed that my younger draughtsmen have been getting away from the Italic of Hondius, which is rather close and pointed, and making a rounder style of Italic, because I believe they find that it reproduces rather better, and upon that I simply have to admit that we are still in the experimental stage. It is a mistake to suppose that this rapid style of drawing with the quill pen is applicable only to the Italic. It is possible to make a very useful kind of lower case Roman. The words "Shanghai" and "Hong Kong" have been written with single strokes of the quill, not built up, but yet very serviceable Roman, and the word "Mongolia" across the map is done with single strokes of the quill, and although not so machine-perfect as built-up letters yet, as I say, it takes about a fifth of the time.

Finally, as to the decorated borders. All these little blocks have been made with this simple decorated border, merely done by blocking in the degree or 10′ divisions. I am bound to say that I do not think that the fact that you might get that map 5 per cent. bigger in the text of the *Journal* if there was not that decorated border will convince me that one had better sacrifice the border and have the map 5 per cent. bigger, because I think that the border and the good style of numbering in the margins are extremely important.

I noticed, with some horror, that Captain Withycombe had left upon his characteristic sheet the block numerals that are, perhaps, the most illegible style of numeral ever invented by a wicked world. It has been known for many years past that in printing logarithm tables it is necessary to go back to the old numerals because they are so much more legible, and I would ask Captain Withycombe to consider the desirability of abolishing the block figures altogether.

There is just one more point, namely, the unnecessity of having a different style of lettering for mountain names. It is asked, What if you have a single mountain? Well, there was an excellent invention made by either German or Austrian cartographers some time ago—about the one thing they have invented in cartography—and that is writing the names of peaks on a curve, with the spot to which the height belongs, and then the height in figures below. That seems a very compact way of writing the essential information about a mountain, and when so written it is not possible to maintain that it is anything else. It is not necessary to have a number of different styles of lettering if the job is done correctly. But all these are matters of choice upon which we are apt to differ bitterly, and one can easily talk too much. I would say, in conclusion, that those who are interested might be glad to look at some of the specimens of the recent drawings we have done at the Society and perhaps talk to some of our draughtsmen about them.

The CHAIRMAN: I am obliged to leave, but before doing so I would like, on behalf of the Society, to tender most sincere thanks to Captain Withycombe for his excellent and suggestive lecture. I use the word "suggestive" because there has been considerable disagreement among those who have spoken after him. It shows, as in all things, that it is not more easy to come to an agreement on these points than it is on anything else, and our friend, Brigadier Jack, is fortunate in being able to tell his draughtsman to do it, and there's an end of it. Mr. Hinks mentioned the appropriate expression Mr. Reeves used with regard to some of the lettering, and I must say it is a "swashbuckling" style of lettering, I do not like it at all. However, that's not what I wanted to say. I hope when matters come to something rather more certain that the Brigadier will get in touch with the Hydrographer, or whoever has to do with these things, and that we shall come to some definite conclusion as to Admiralty charts and shore-

going maps and plans. I was recently shown, with immense pride, a plan of the river down by Tilbury; the possessor had not been satisfied with what had been done by the Admiralty and he had made a plan. I asked him what guide, generally speaking, he had as to the lettering, and he said, "I choose what I thought was the best." Certainly his plans were entirely different from anything shown this afternoon. They were very good.

There is one point I would like to put before the Brigadier in regard to maps. I happen to have followed the sea all my life. What we who go to sea want maps for is to find our way from place to place or else, when reading interesting books, to see where the places are that we do not know. We want a clear legible map that we can understand, not the precious thing of which the expert says, "Oh, but if you were really a map-reader and understood these things, then you would know." Maps are made for the general public to use when they want to get from one place to another. I am told that in the lettering one should write the name of the town, or whatever it is, to the right of where it is, but if you will look at various maps you will find that sometimes a name is written on top, sometimes underneath, sometimes to the left and sometimes to the right of where the place is. It is quite true if you know beforehand where the place is or if you have had a good deal of teaching and knowledge of maps, you will know whether the town is to the right, left, or where, and whether what is represented is a river or a range of mountains. Personally I think if the range of mountains had not been put in, for instance, where Kunlun is, many would not know whether it was a range of mountains or a district. It seems to me one does want something indicative of all those points. But the best point of all has been a most charming and delightful lecture, followed by a most interesting discussion. I will ask Brigadier Jack to take my place, and, before I finally leave, call upon Mr. Emery Walker.

Mr. EMERY WALKER: I think in the Ordnance Survey there is a somewhat melancholy feeling with regard to lettering, but if you look at Ortelius' Atlas you will see that the small names, although beautiful, are quite legible. I am, of course, quite aware of the difficulty in regard to Ordnance Maps. It is necessary to have the villages in very small lettering, and it is not possible to get so much character in the letters on a small-scale as on a large-scale map. But I think the maps Mr. Hinks showed us were going in the right direction; at any rate, the artist has looked at good maps, and it is quite possible that we may come to something very much better than we have now. I think it was about fifty or sixty years ago that the Ordnance Survey first started making photo-lithographic maps—at least that is as long as I can remember—and had some types cut from models of the very ugliest description that had ever been made. They were based upon the type of Bodoni at the end of the eighteenth century. The characteristic of Bodoni's type is a very fat down-stroke and a hair line for the up-stroke. The types cut for the Ordnance Survey were based upon that kind of type, and they used to stamp them—and I believe they do still—on paper and they were then photographed. If they are reduced much the thin lines tend to be lost altogether. The letters used for small lettering on a map must be, more or less, the same thickness; the smaller the letter, so the thin lines, the up-strokes and the down-strokes, must approximate to the same thickness.

Major BOULNOIS: Mr. Reeves, so far, seems to have been quite alone in his criticism of the new lettering, but I should like to say that I fully agree with him. I think in some respects that we have gone rather wrong on the subject, and in a way the worst man to choose to design letters for maps is an artist. The man I should like to see put to design the lettering on maps is just the "averagesort of bloke" who is a poor map reader, constantly losing his way, and if possible a

somewhat short-sighted fellow! The main essentials to my mind of lettering on maps are absolute legibility and the possibility of differentiating between the various things that have to be shown on a map by using different styles of lettering on the same map. I think we worry too much about the artistic look of the lettering, though of course one does not want to see actually ugly letters. There are, however, plenty of styles of lettering which are, first of all, legible, and, secondly, are nice to look at. Some of the lettering which we have just seen on the slides filled me, I must own, with—I was almost going to say—horror. Having, I suppose, no artistic soul, I merely looked at them from the point of view of being somewhat illegible and somewhat highbrow. I think that if there is to be a re-design of lettering the main points should be entirely those of legibility and simplicity. A map is, after all, an expression, not of art, but of jolly hard work in the field. A man has gone out and made surveys for that map, and it seems to me that some very simple style of lettering—even that Egyptian which has been described as so dreadful—best expresses the work that has been done in the making of the map. I do not in fact think that it is an occasion for attempts to get back to da Vinci and Trajan, and on these grounds I find myself ranged beside Mr. Reeves.

Captain WITHYCOMBE: I will take the remarks of the last speaker first while they are fresh in my mind. He puts up a plea for simplicity. Well, I think it is exactly what we are striving for. Look at the alphabets submitted: Roman capitals, the lower case and the Italic. I do not see what more can be asked in the way of simplicity. You have there the bare bones of lettering. That little bracket connecting the S with the T to which Colonel Winterbotham objects is not essential, and need not be used at all —you see the S and T in juxtaposition in another place without it—it is not really part of the alphabet. For a simple legible straightforward alphabet, I do not think you can better the Roman capitals or the Roman lower case as shown; there are no frills, but just straightforward letters which could be easily written and which, above all things, can be easily reproduced. I claim that they are far more legible, for instance, than the word on the specimen, namely, *armunno*, in which the straight serifs or lines are so long that they connect the *u* to the *n* and the *m* to the *u*, and the thin arches and even spacing defeat the eye in its effort to distinguish one letter from another. If you will study the specimen sheet you will see that there are a hundred little subtle points, but they are introduced to get legibility, and it is legibility that we are really aiming at.

Then with regard to what Mr. Reeves said, one can only say *de gustibus non est disputandum*. It is purely a matter of taste. If a person likes the lettering on the International map better than that of Hondius, then he does, and it is no good arguing about it. But I sympathize with him because I know how I should feel if I had been working all my life at one style of lettering and a new school suddenly sprang up and said, "You are all wrong." With regard to the necessity for various styles of type. Personally, I think that the sans serif character used on the characteristic sheet for the hills, which Mr. Hinks disagrees with, is unnecessary, but it was felt that as the Ordnance Survey maps have been showing the hills in that way it was perhaps a dangerous precedent to depart from it. Whether it will be ultimately adopted or not, I do not know. But I do not go quite all the way with Mr. Hinks. I think that there are certain types of detail which necessitate another sort of lettering to distinguish them. For instance, the Antiquities. If you did not indicate the Antiquities by means of old English characters it would not be possible to pick them out as at the present time. If you are interested in barrows, earthworks, or other objects of antiquity, these things jump to the eye at once because the old English print guides you to the

information you seek. So that there is something to be said on both sides, but for rivers and natural features I do not think anything can beat the Roman and Italic alphabets.

Mr. HINKS: Could you tell us if, in your opinion, the Italic we have been using would fill up more than the one you have designed?

Captain WITHYCOMBE: I admire the Italic enormously, and I think it would reproduce well. In fact, I do not think there is any doubt about that. I am not at all sure it would harmonize with our maps; I fear that quill-pen Roman capitals and even the quill-pen lower case would not do. We need a drawn letter to convey that sense of precision and accuracy that we must get into the Ordnance Survey maps. It is a psychological point. When you look at an Ordnance Survey map it must look accurate just as we hope it is accurate, and the writing must convey that idea right through. I do not think that would be possible with the slight irregularities and also the idiosyncrasies of the individual draughtsman which are sure to occur in quickly written quill-pen work. Each draughtsman is artistic, and he puts himself into it. Our draughtsmen at the Ordnance Survey have to plod along conforming to an exact standard; each man has to be able to put his work down beside that of every other man and it must assimilate. With the quill-pen work I am afraid there will be difficulty in getting that perfect assimilation. I regret that because, of course, it is really a revival of the art of the scribe, and an important and most interesting work that is being done at the Society's house upon which I congratulate Mr. Hinks' draughtsmen very heartily.

Brigadier JACK: I expect you would all like to spend a little time looking at the specimens and discussing them; but having been put into the chair I have the advantage of being able to say something more. I also would like to add my great appreciation of the writing being done by the R.G.S. draughtsmen now. I think it is charming. But we have at the Ordnance Survey, as I am sure Mr. Hinks and others will admit, a quite different problem, and there are certain things we would like to do that we feel we cannot. We cannot be quite so free as your draughtsmen are. On the point of block letters for hill features, Captain Withycombe let the cat out of the bag by confessing that it was not his choice at all. It was I who chose them, and I had a reason. Although I quite agree one ought not to have a great variety of styles on maps, there are, I think, certain cases where some variety is necessary. Captain Withycombe mentioned antiquities. I do not think we can get away from a different style of type in that case. I may be wrong in thinking that it helps the eye to have a different style for hill features; I am quite ready to think about it, and Mr. Hinks can take comfort from the thought that our new map is not yet begun. It is a point we shall have to consider.

Admiral Goodenough said he wanted a map that everybody could understand. Well, I can assure him that our object at the Ordnance Survey and the object of every decent map-maker is to produce a map that does not require an expert to understand it, but one which any person of ordinary intelligence can understand without difficulty. We have in addition to making it legible and useful to make it a thing of beauty, which is quite possible to combine with its practical uses.

I am sure that you will agree that we have had a most interesting discussion, and that much good has come out of it.

Professor FAWCETT: Unfortunately I was not able to be here for the opening of this meeting and so missed the greater part of Captain Withycombe's paper. I look forward to reading it with the interest and the care it deserves. My chief comment is a repetition of the view already expressed, that legibility should be

the prime consideration to determine our choice of styles of lettering. I believe that legibility is fully consistent with a really artistic style; though it is equally true that any superfluous ornament reduces legibility and is therefore to be condemned—and all ornament should be suspect of superfluity until it has made out a good case for itself.

May I suggest that the presentation of new, or old, styles of lettering in whole alphabets, or in familiar words and phrases, does not offer so severe a test of their legibility as presentation in unfamiliar groups of letters, in which those letters which may possibly be confused are brought together? The word "armunno", which Captain Withycombe has used for *m*, *u* and *n* illustrates my point. I feel that the *t* and *r* of the italic styles shown are not very clear and might come badly out of such a test.

I remember an article in *Nature* a few years ago on the forms of the Arabic numerals (24 February 1916) which put forward ideas some of which would be valuable in this connection. One point was that the form should be such that even the destruction of part of the figure should not make it impossible to determine what figure it was.

Though it is strictly outside the topic of the paper I should like to refer to the matter of the border round the maps mentioned by Brigadier Jack and Mr. Reeves. Here I hold that it is desirable to make use of the border to give much additional information not only as to scales, in degrees and other units, but also as to bordering lands and seas. This information can be, and should be, set forth in a pleasing style; but map space is too limited and too valuable to be used for any purposeless ornament, even outside the map itself.

Mr Hinks suggested that the use of different styles of lettering for names of hill ranges and so on is unnecessary. Here one must agree; but though not strictly necessary it is often a real convenience. Personally I like the style used for this purpose on the sheet of O.S. writing which has been handed round, but it might add clearness if the plan of writing sea names in blue were extended and hill names were written in brown. Lastly, it is perhaps worth while to note that the two sets of writing before us, the O.S. and what we may call the R.G.S. styles, have been devised for somewhat different purposes. Each can learn something from the other; but it is unlikely that the solutions of such different problems can be identical.

Note on a few specimens of lettering by the Junior Draughtsmen of the Society.

In developing the style of lettering which is now used for blocks in the text of the *Journal* and for the simpler lithographed maps we have aimed at two things: beauty of appearance and rapidity of execution. The former has been sufficiently discussed above, and opinions will differ whether the aim has been achieved. A few words may be added here on the more practical question of the speed and consequent economy of the new style, that is, of the old style revived. Instead of building up the letters, large and small, with a steel pen, drawing the outlines first, and then filling in the thick strokes, our junior draughtsmen are learning to write the letters with quills, drawing and building up only a few of the largest names. The Rome Ptolemy of 1490 and the Hondius World Map of 1608 have been studied for forms of the Roman and Italic letters, modified a little to suit the quill. We are still in the experimental stage, and the specimens here given must be considered as suggestions for criticism rather than as adopted models. Incidentally we venture a few suggestions on the new Ordnance Survey alphabets.

Numbers 1 and 3 are upright and sloping numerals drawn with the steel pen, built up and filled in. Time about sixty minutes for each set. Numbers 2 and 4 are written with a quill: time about three minutes for each set.

Number 5 suggests a few alternatives to the single letters of the O.S. alphabet, and in the word MINUTE written twice shows the advantage of writing the capital U with two heavy strokes, which in most combinations balances better than the O.S. form. These two words are built up with the quill to give a result much like that of the steel-pen drawing, but easier and quicker.

Number 6 is reproduced from an early version of the specimen for the new One-inch map of the O.S., since somewhat modified. Drawn with the steel pen.

Number 7 gives some of the same names drawn or written with the quill: the first two built up; the third in single strokes with built-up serifs; the rest simply written with the quill.

Number 8 is a map in which the names are written direct with the quill, except for the name ARABIA, in which the serifs are built up. Speed about one hundred names in seven hours, or about five times as fast as the same drawn with the steel pen.

Numbers 9 and 10 are alphabets written freely with the quill in single strokes with the quill held in one position throughout: no building up of serifs. Time about thirty minutes for each complete alphabet of upper and lower case. These show on a large scale the formation of the writing used in Number 8.

Two of the three junior draughtsmen received their early training in the Art Schools of the London County Council, and all three have attended evening classes at the Hammersmith School since they have been employed at the R.G.S. We are especially indebted to their instructor, Miss Madelyn Walker, for the interest she has taken in this experiment of developing an effective style of rapid draughtsmanship. A. R. H.

THE RAT RIVER

CLARA C. ROGERS

IN the summer of 1926 Gwendolen Dorrien-Smith and I travelled from Edmonton to Vancouver Island via the Mackenzie river delta, the Alaska–Canada boundary, the river Yukon, and the fjords of the Pacific. The plans for this circuitous journey had developed gradually. One of us wished to visit Vancouver Island and the other had waited for years to see Alaska; a neighbour connected with the Hudson's Bay Company told us that their Mackenzie river steamer trip was one of unusual interest. Our problem then was how to combine these three journeys without retracing our footsteps. After careful study of the travel literature of Northern and Western Canada, we wrote to the H. B. Co. authorities in Winnipeg asking for advice about three alternative routes from the Mackenzie river to the Pacific: (1) via the Liard, Dease, and Stikine rivers to Wrangell; (2) via the Peel river to Dawson City; (3) via the Rat river to the divide and down the Porcupine and Yukon rivers to Fort Yukon.

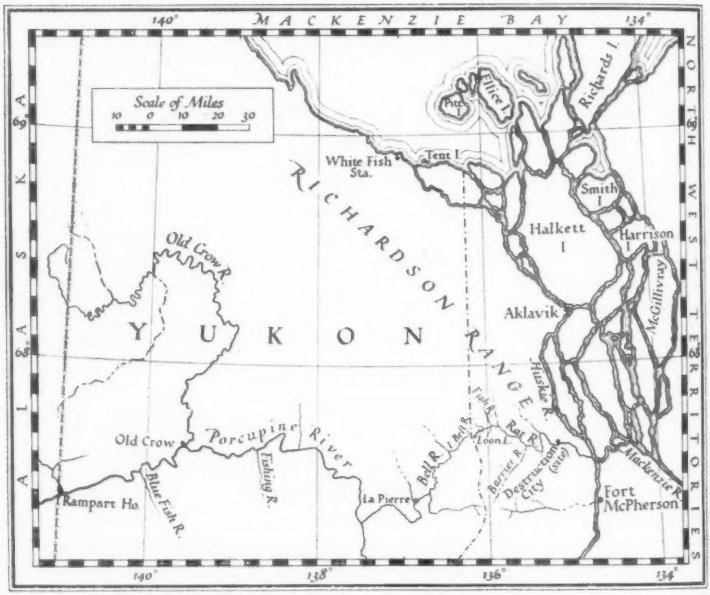
They vetoed the first two as routes of summer travel for women, but they informed us that the Rat river route was possible, although it was neither pleasant nor easy. Thanks to the kindness of these authorities, who sent a wireless message during the winter to their store at Aklavik, Indian guides were engaged; and when we arrived at Aklavik in June, Lazarus Sittichili and Jimmy Koe were waiting for us. The Mackenzie river journey from Waterways to Aklavik was certainly full of interest; so was our journey by steamer from Fort Yukon down the Yukon river to Tanana, up the Tanana river to Nenana, and thence by rail to Seward, port of call for the steamers from Seattle; but these are travelled routes with regular, if infrequent, means of communication. Our 600-mile journey from Aklavik to Fort Yukon was through country with no regular means of communication, and the earlier part of that canoe journey when we pushed our way up the Rat river may claim a more precise description.

The Rat river was—we knew full well—no pleasure trip, but a means to an end, the only means of keeping inviolate our travel motto: "Never return on your tracks." The Rat river was, we knew full well, rough, cold, swift, mosquito-haunted. We were forewarned and forearmed. Not only had the H. B. Co. memorandum stated conditions very plainly, but every old-timer between Edmonton and Aklavik had painted the reputation of the Rat in lurid colours. We set out with veils, puttees, gauntlet gloves, elastic wristbands, oil of citronella, bi-carbonate of soda, and Flit, cheerfully anticipating the worst. This plain, unvarnished account of our nine days' struggle with the Rat concerns a river practicable as a frozen winter highway for trappers and for Indians, a river very seldom used as a summer route, a river truly described as "scarcely navigable."

We left Aklavik on July 7 in the H. B. Co.'s motor-launch, with their two men, our two Indian guides of the Loochoo tribe, our tent, rifles, three weeks' food for the four of us, an 18-feet Peterborough canoe, three paddles and a tracking rope. We steamed about 70 miles up the Huskie, a branch of the great Mackenzie delta; all day we were winding slowly round the Richardson range. Many green hill slopes were covered with a faint blue

haze; our glasses discovered a mass of lupins in flower; these flowers grow about two feet high in that latitude. The mouth of the Rat was sluggish, bordered by willows growing on mud banks, and thereafter for 25 miles the current was calm and muddy, flowing between high banks that hid the surrounding country, but as we neared Destruction City the banks opened out and we could see the mountains ahead lit up by the midnight sun.

The flowers on the river-bank were brilliant, blue vetch, mauve vetch, white valerian, yellow Senecio, blue lupin, and masses of the waxy white Pyrola. Birds were fairly abundant, geese and ducks, gulls and various small waders, the white-headed eagle and the northern raven; and one huge white owl perched in a spruce tree. In the windings of that sixteen-hour river-journey we saw no animals except two foxes and some musk rats. They landed us,



after midnight, near Destruction City, but we saw no trace of the Klondikers' huts on either bank. In the disastrous, frenzied days of 1898 when the gold fever was at its height, many people tried to "get in" by travelling down the Mackenzie from Edmonton, thence by the Rat river over the divide, and down to Fort Yukon. Few of all those who set out succeeded in their enterprise, and those few, when they reached Fort Yukon with the provisions that they had dragged all those hundred miles, found that provisions had no value. The larger number turned back broken-hearted by the difficulties of the Rat river, and the camp they formed at Destruction City long bore witness to their failure.

The two men steamed away in the launch to Fort McPherson, leaving us and our Indian guides in the silent wilderness. We decided to camp on the

right bank because it was higher and we hoped a breeze might scatter the mosquitoes, but when we had dragged our tent and bedding up the muddy bank on to the muskeg, they greeted us in black swarms. We crawled under our mosquito bars fully dressed, kicked off shoes and gaiters, took off hats and veils and went to sleep in daylight on a bed of Ledum, moss, and cranberry. There was heavy rain that night and we crawled out into a world full of mosquitoes, to breakfast on fried bacon, bannock and jam, washed down with black tea. The sky was grey without relief and the rain came down at intervals. We started up the river, all four in the canoe, but when we had paddled a few hundred yards troubles began. We walked and the Indians waded. Walking meant fighting our way through scrub of willow, alder and Elaeagnus, shielding our veils with lifted arms. Wading meant pushing and pulling the canoe through broken water, over rocks and boulders ; often those two were waist deep in the ice-cold current. We must have made less than a mile an hour, but we could never stop to rest, always the mosquitoes drove us on. Now and then our guides would ferry us across a rapid, battling with the current, Lazarus adjuring the boy Jimmy in strange Indian words, sometimes getting swept down stream a considerable distance before they could "make it." At noon, on a stony spit, Lazarus plucked and toasted a goose he had shot, and there, in a cool breeze, the mosquitoes left us for a blessed hour. At five o'clock we were held up by swift water, and there was nothing for it but to unload the canoe, portage it into a spruce wood and camp. The river was rising and our camp was 18 inches above water-level. Our prospects were gloomy; Lazarus looked at the sky and said that the river might be many days in flood; the mosquitoes were thick as ever.

We crawled out at six o'clock next morning to look at the twig Lazarus had stuck in the mud, but the water was still rising, so we retreated to our mosquito bars. It was a day of showers and foreboding, the sky was thundery, the Indians were sleepy and silent. We acknowledged, for the first time, a possibility that the Rat might defeat us after all. Lazarus would not commit himself: we might be held up one day, or three or four. We were in his hands, for we were bound to pay each guide fourteen dollars per day, well aware that if we urged or commanded them they might at any moment refuse to continue the journey. Later in the day we put on our armour and explored the nearest hill, were we found larkspur, lupin, Polemonium, *Linnaea borealis*, Pedicularis nearly two feet high, Vaccinium, Oxycoccus and Pinguicula; a handsome yellow Rumex with a succulent stem appreciated by the Indians, and sheets of yellow Arnica; but even on those heights mosquitoes destroyed our peace. Next morning the sun was shining and the roar of the river was not so deep; the twig was high and dry. We remained on the left bank while they launched the canoe and paddled, with the fury of demons, over to the shallow side of the river. Thereafter we were cut off from our guides, who struggled up the right bank while we had a rough scramble along the side of hills that fell sheer into the water. The Rat was there about a quarter of a mile across, divided into many channels by islands overgrown with spruce and willow. It was hot and sunny all day, and we steamed with perspiration inside our veils. Later, while we cooked pork and beans for the noon meal, the guides had to chop down overhanging willows to make a tracking path for the canoe. That evening we were

again cut off from our guides; for an hour and a half, standing on a high bank, we awaited them. The ground was a swamp of muskeg, the air was filled with a black swarm of mosquitoes; there was no human soul or human dwelling in 300 miles, and in every direction there was thick bush with neither track nor trail. Lazarus came at last, walking over the muskeg on our left bank; the water on the other side was too swift, they had returned and were making camp down river. Once again we slept in a spruce wood, and our bedding was a layer of scented spruce boughs.

Next day we portaged the canoe and baggage some 300 yards to get above the swift torrent and then we had another hard spell. Sometimes rock rising sheer from the river made the left bank impassable, and they would ferry us across. We took a bend to the right, thenceforward proceeding west instead of south; we might have cut across the hills, but we preferred to keep in touch with the canoe. Many hills were formed entirely of muddy soil, their sides were grooved with channels which splayed out as they reached the river into fan-shaped beds of soft mud several feet in depth. We negotiated these by wading in the water where stones gave us a foothold.

Those early days on the Rat were days of constant struggle; branches and snags threatening our clothing, mosquitoes for ever humming and biting through unguarded holes; thunderclouds overhead; anxiety about rising water; showers of rain so that we were soaked after a few yards' walk in the dripping undergrowth; or sunshine and steamy heat in a river-bed shut in from any breath of wind.

On the evening of the fourth day we came to Barrier river and camped on an island above the mouth, whence we saw a beautiful range of mountains ahead of us. Next day we had hard walking on the right bank, over muskeg, through swampy alder thickets and then up a steep hill to circumvent a face of rock that fell sheer into the water. The winding course of the Rat at this point seemed to mock our efforts at progress, one patch of snow on hills seen the day before appearing and re-appearing, always, apparently, just above our heads. Passing a fine rocky canyon on the left we came out at last into more open country; all that day the water was less swift, the river narrower and the boulders not so formidable. The following day we had an easier time, walking across stony spits and cutting off coil after coil of the river; and after lunch there came a little breeze and the cloud of mosquitoes was so much thinner that we were able to wash our hands and faces in the shallow water. We were surrounded by fine mountains; many were black or brilliant terra-cotta, some were barren, others overgrown with spruce and then with cream-coloured caribou moss to the summit. The wild flowers were brilliant, the most beautiful being *Epilobium latifolium* with large rose-coloured flowers and silver leaf, and the pale yellow *Papaver nudicaule* growing among stones. On the banks were only white poplar, willow, spruce and alder.

Bird life was scarce from Destruction City onwards; we saw yellow warblers, loons, red-throated loons, gulls, yellow-shanks, American robins, silver-breasted warblers and sparrows. Game was even scarcer; we frequently saw tracks of moose and caribou and once or twice the tracks of a bear, and our guides saw a single beaver.

On our seventh day we had easy walking across the stony spits; then there

were many creeks to wade, and later stretches of muskeg where we sank in ankle-deep at every step. The day was sultry, and clouds hung low over the mountains. We passed a large river flowing into the Rat on the left bank, but it was not marked on the sketch-map we had obtained from the H. B. Co.

The days had now become merged in routine. At 6 a.m. one of us would crawl out fully dressed to waken our guides. In five minutes the fire would be crackling; then we would breakfast and strike camp, the Indians always changing at the last moment into their wet clothes of the day before. We would start by 7.30 or 8 o'clock. The men would be wading nearly all day; they could seldom track with the rope, for that entailed felling timber to clear the banks. Even in the middle of the river mosquitoes blackened their hats and veils and parkees. We would scramble along, often wading to an island to get more open space, always watching the canoe lest we found ourselves, at the upper end of the island, cut off by a rushing torrent. Often we did not know if we were on island or mainland, so intricate were the channels of the river. At eleven we would halt for an hour, light a fire, partially dry ourselves and cook salt pork and tea. Lazarus told us the golden rule of travel among Indians is to husband strength in the morning and work your hardest after dinner. From twelve till four we would struggle on and then came a halt for tea and pemmican, even half an ounce of pemmican would put new life into us. From five until eight or nine we went on again. Never once had we to encourage or urge our guides, although their rate of pay gave them no inducement to hurry. Lazarus, the best guide in the Fort McPherson country, had only once been up the Rat, and Jimmy had only set out with us because he admired Lazarus. Jimmy's half-humorous, half-melancholy refrain was always: "No more Rat for me."

We came that afternoon to three forks of the river with mountains ahead of us. Fish river, flowing in from the range on the left bank, is a picturesque mountain torrent with a fall. We unloaded and portaged about 200 yards, then, rejoining the middle channel, found the Rat had completely changed its character. There were neither islands nor rapids now, no boulders nor broken water, only a slow brown current 20 feet below the level of the country, winding in serpentine coils. The river was perhaps 30 feet wide and the current smooth, so that the guides could paddle, but it was hard enough for them to work upstream, so we walked across the muskeg, guessing at the course of the hidden river by a line of spruce trees that usually zig-zagged along the bank. There were mountains ahead and a break in them; at last we were in open country. But it was weary walking, for every step in the muskeg seemed to be two forward and one back. We camped on a rainy evening, still in perpetual daylight, looking ahead at the pass and feeling that we really had defeated the Rat.

Next morning we found the same conditions on our forward route, spongy muskeg for us and a winding river for the guides. Lazarus very soon came to a fork of the river and turned leftward, being unable to see in which direction he was travelling. We suspected his mistake, and called to him that he might climb up the bank and scan the country ahead. In one moment he had shinned up a solitary spruce tree and corrected his bearings; then he paddled back to the fork, took the other branch, a more sluggish one, and we all got into the

canoe. We paddled through a chain of peaceful lakes, and so we came to the divide, with Loon Lake set among gloomy mountains in a world of silence and reflections. We made four portages, the shortest was 20 yards over a bank from one lake into another, the longest was about half a mile over swampy muskeg. During the third portage, the long one, we saw a mountain sheep hurrying up a rocky face on our right. Finally, the canoe was teased along a channel just its own breadth, overhung by alder and willow, but the shrubs grew thicker and more tangled, so that we could not follow the trickle of water into the Little Bell river but had to make our fourth portage. Having made it, we stood on that bank and watched the water flowing downward. Standing there in the muddy soil we had both Canada and Alaska at our feet.

We launched the canoe and sped down that winding river, full of little rapids, snags and boulders. After a while, the water being low, we had to walk. We had a most miserable hour walking on, or among, niggerheads, a nightmare form of progress; only a butterfly could skim over niggerheads with any security. The hard heads of grass grow close together, but they wobble at a touch, not one is big enough to support your foot, and at every step you sink knee-deep, or thigh-deep, into swamp between them. If you try to balance on them you sink suddenly with every chance of a broken leg, and if you seek for solid bottom you must lift your leg two feet or more for every forward step. We rejoined the canoe at last and shot down the rapids of the Little Bell. About nine in the evening we came to the mouth of the Bell river, broad and placid and free of boulders ; moreover, almost free of mosquitoes. There our nine days' discomfort ended and we could wash and change our clothes.

On the tenth day we paddled down to La Pierre House. This place, marked large on every map, is now deserted; Jackson brothers of Fort Yukon have one empty cabin there, but we saw no other dwelling. They keep a few stores in it and come up twice in summer with their launch to cater for any Indians camped in the district, and for any travellers who walk the 90-mile portage from Fort McPherson. A mile below this solitary cabin, as we came round a bend we saw a grizzly bear at the water's edge, a strange and rather shapeless form, creamy white under the evening sky. How many deafening shots we fired in that stillness no one knows; but Jimmy killed the bear. It staggered into the willows breathing heavily; the Indians went ashore to finish it, insisting that we should stay in the canoe. Half an hour later we were all seated round the steaming corpse, on a flat ledge of mud bank among the willows. To us the killing and eating of the bear gave little pleasure, the meat was tough as string and more unpleasant than goat, but Lazarus and Jimmy feasted far into the night. We ate boiled bear for breakfast, and it was more unpalatable than fried bear.

Fifteen miles below La Pierre House is a reach of swift water near Sinclair's rock; below this point our guides left us, to return on foot to Fort McPherson. We paddled on alone, taking four days to cover the 115 miles to Old Crow. In that Indian settlement we found a single white man, who gave us welcome, and procured an Indian guide who accompanied us down to Fort Yukon. The journey from Aklavik to Fort Yukon took us twenty days.

THE DUNES OF SABLONEY NEAR ARCACHON

J. J. WOLFF

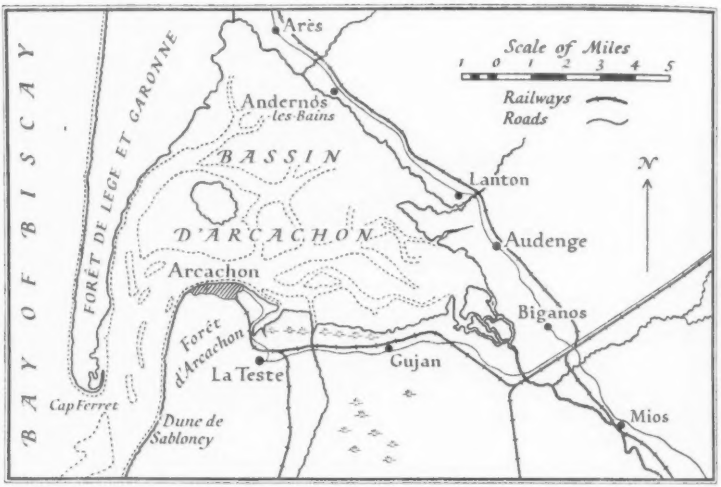
THE largest sand dunes in Europe are on the shore of the Bay of Biscay. Those in the neighbourhood of Arcachon are particularly interesting as one is a hill 300 feet high, which is changing its shape as well as its position. This part of the country was practically waste at the end of the eighteenth century, when trees were planted on a large scale, as it was seriously feared that the belt of sand dunes along the coast would advance inland and engulf important towns. The forests thus formed have stabilized the dunes. But at the place where they have grown to their maximum height they are quite bare and appear to be engulfing the surrounding forest. It is obvious that some movement is taking place, but no measurements appear to have been made to ascertain the extent and speed of this movement, so I have taken some photographs and have cut marks in the trees during the last few years, in order to obtain a rough indication of what is really happening.

No map exists showing accurately the configuration of the land, so it is necessary to explain that the forest is about 50 to 100 feet above sea-level. From it rises the sand hill called the Dune de Sabloney. On its eastern face the hill has a bare and precipitous slope extending from the top to the base without any break. On the western and southern sides the slope is much less abrupt. On the northern side there is a plateau at an elevation of about 200 feet reached by a steep ascent from the forest (Plate 3). From this plateau to the top of the hill the ascent is less steep (Plate 1).

On the plateau are three parallel ridges extending from east to west. The absence of fully grown trees here indicates that the sand has not been stationary long enough for the trees to grow up before being engulfed. To ascertain exactly what movement is taking place here, I cut a mark 5 feet above the ground-level in the trunk of a tree standing somewhat apart from the others. The following year I revisited the spot on 24 June 1925, and took a photograph (Plate 1); the mark then was completely covered by the sand, but the tree can be seen on the left-hand side of the picture. Plate 2, taken three years later (18 September 1928), shows that only the topmost twigs of this tree remain exposed. They can be seen in front of the standing figure. The twigs in front of the reclining figure comprise the tops of the trees seen in the centre of Plate 1.

To determine the movement of the hill on its northern and north-eastern faces two spots were selected. The former, shown in Plate 3, is at the end of a " coupe feu," a wide lane cut to arrest forest fires; while for the latter was chosen the highest point in the forest, where there is a large clearing, probably due to a comparatively recent fire. To mark the base of the hill on its northern side on 24 October 1924, I cut a mark at eye-level in a tree. On returning to this spot eight months later, I found that the base of the hill had advanced 4 yards northwards. But in the course of the succeeding three and a quarter years the base advanced only another 7 yards. Thus the advance averaged 3 yards per year for the entire period of observation. Plate 4 was taken in September 1928 at the north-eastern side of the hill. Here the advance averaged 6 yards per year from October 1924 to September 1928. On the

eastern side the rate of advance was still greater. In fact, it has been so rapid there that all my marks have been buried and I have been unable to measure the movement.



Having thus obtained some exact information regarding the changes taking place, I have started a more general investigation, as I believe there is a general movement from west to east, controlled by the movement of the adjacent seashore, as well as a subsidiary movement of a more irregular nature. Both these movements are rather spasmodic. Further investigation requires that the dune system shall be accurately mapped, with close contours, and I hope that some way may be found of obtaining such a map.

1. Plateau and summit of the Dune de Sabloney, 1925

2. The Plateau in 1928

3 North face of the Dune, 1924

4. North-east face of the Dune, 1928

JEAN ROTZ: HIS NEGLECTED TREATISE ON NAUTICAL SCIENCE

MISS E. G. R. TAYLOR

THE men of science of the sixteenth century were peculiarly unfortunate in that their theory outstripped their practice, largely owing to their inability to make precise measurements. Failing a timepiece that was even tolerably accurate, the chronometric method of finding the longitude as outlined by Gemma Frisius* in 1530 necessarily remained untried: while without a vernier, or even a diagonal scale (for Nonnius' device was scarcely applied) angular measurements could be made only to about 10′, save on quadrants so huge as to be impracticable in normal circumstances. The result was that astronomical methods for fixing position were at a discount. The practical man, indeed, was not entirely without justification in concluding that he got on better by rule of thumb.

Nevertheless, both Spain and Portugal had their well-established Schools of Nautical Science: the middle of the century saw the brief but brilliant career of Richard Chancellor, seaman and mathematician; while buried in the Royal Library of England were the works of Jean Rotz, of Dieppe, hydrographer, instrument maker, student of marine astronomy, and experienced sailor. One of his manuscripts, hitherto apparently unnoticed, forms the subject of the present study.

The cartographical work of Jean Rotz is typical of the French school of the fourth and fifth decades of the sixteenth century (e.g. Desceliers, Vallard); nor is his treatise on Nautical Science † unique, save in its survival. Pierre Crignon, the poet-navigator of Dieppe, had written his 'Perle de Cosmographie' in 1534, and from Delisle's note ('Histoire de l'Academie Royale des Sciences,' 1714), its subject-matter, in part at least, was navigation. Jean Rotz, however, is here singled out for notice because he placed his knowledge at the disposal of Henry VIII, who, by failing to allow the publication of this treatise (and of that of Roger Barlow, written two years earlier), let slip the opportunity for providing that instruction in nautical science for which Hakluyt was still vainly pressing at the end of the century.

Jean Rotz' manuscript, written in French, is sometimes difficult to decipher. The title runs: 'Treatise on the variation of the magnetic compass and of certain notable errors of navigation hitherto unknown, very useful and necessary to all pilots and mariners. Composed by Jan Rotz, native of Dieppe, in the year 1542.'

In a long and flattering preface to the King, the writer says that he comes before him not empty-handed, but bearing a book and an instrument for his acceptance: the book composed for all those who wish to taste the pleasant fruits of Astrology and Marine Science. It is not written, he adds, in the common tongue of the (English) people, although the author, having spent part of his life in England, has some knowledge of the language, but he knows the King's love of the French tongue, while his Grace may, besides, choose whether to keep the book for himself and so be the superior of his subjects in science, or whether to have it translated for the instruction of his mariners.

*Gemma Frisius, 'De Principio Astronomiae et Cosmographiae.' 1530.

†Royal MSS., 20 B VII, p. 303.

"Laquelle seroit cause comme j'estime qu'on trouveroyt en pou de temps autant ou plus de bons et parfaictz pillottes et astrologues de marine en Angleterre quen aultre lieu du monde." Rotz excuses himself for not presenting also a nautical chart, but does not doubt that the king has already received examples as fine as any he has made or will make. Further, he begs his Grace not to notice the workmanship of the Instrument, since it is the first of its kind to be made.

The book itself is divided into three parts, of which the first treats of the spherical shape of the Earth, with emphasis on the proof by experience on long voyages. The second part deals with the imperfection of the marine chart and its causes: ". . . la maniere et facon du compas aymante, la difference du regard de son north (*sic*) envers le pole, et la plus commune oppinion sur ce tenue, avec la premiere maniere et facon de la carte marine, emoins par les modernes, observee; et par consequent de la difficulte et faulte de ladicte carte procedant de ladicte difference de regard du north du compas envers le pole."

The third part treats of the construction and use of the instrument, which the inventor calls a Differential Quadrant (see Plate). Actually it is one of the precursors of the theodolite, and a very elaborate one. The large magnetic compass set in the horizontal circle suggests a marine origin, and it may be compared with the contemporary instruments designed for taking horizontal bearings by such landsmen as the brothers Arsenius, which were orientated by tiny compasses inset on the margin. Like Waldseemuller's Polymetrum,* Rotz' instrument could take a combined altitude and azimuth, but its prime purpose was for the accurate determination of the variation of the compass. Thus the title of Part III runs: "La composition et usaige de linstrument que nous avons praticque pour lobservation des differences du compas declarez en la precedente partie. Et la maniere de prendre toutes latitudes et eslevations polaires. Avec la maniere et usaige de praticquer la longitude par la lune et une etoile fixe selon la doctrine des cosmographes. Et aussi lusage pour scavoir les heures egalles du jour artificiel en toutes regions et finablement une brefve doctrine pour prendre toutes longitudes, latitudes et profunditez de geometrie par la moyen dung Instrument."

The making and assembling of the instrument are described with great care, separate working drawings being given of each part. These reveal that the general sketch given in the figure is faulty in some important respects, notably as regards the fitting of the vertical and horizontal circles. Actually the horizontal part of the instrument is in three concentric sections. The innermost is the mariners' compass, the needle very delicately poised, and protected by a sheet of glass. This box compass carries an alidade, the fiducial line corresponding with the N.—S. line on the compass rose, and extending across the angular graduations on the second section, the mobile circle. It is into this latter that what Rotz calls the orthogonal circle is mortised, so that it can be rotated into any desired position. The outermost base circle is rigid.

The vertical portion is also threefold: the outer and rigid graduated circle embraces a mobile circle carrying sights. These are joined by a thread (fil)

*Compare also *G.J.*, 72, No. 4, p. 329.

representing the axis of the Earth. The mobile circle carries a ring in a third plane which is graduated to serve as an ecquinoctial or universal dial. An important feature not shown in the drawing reproduced was the levelling device. This consisted of three metal knobs screwed at equal distances into the rigid base: by twisting these knobs farther in or out the base could be levelled with the help of a plummet. A suspensory ring was provided for use at sea, and the inventor points out that to avoid the instrument's swaying in the wind the base must be weighted with lead at discretion.

Like Pierre Crignon and some other intelligent men of his day, Jean Rotz believed that he should find in the variation of the compass a solution of the problem of longitude. Reasoning from insufficient data, his conclusion was faulty, but none the less interesting. The facts he set out are these: he knew that the deviation at his native town Dieppe was 10° E., while he had himself determined a deviation of 8° E. in Guinea, and 10° W. in Brazil; and he learned from those who frequented the navigation to Terre Neufve (Newfoundland and Canada) that there it was as much as "half a run of the wind," or 22½° W. He records further that two ships of Dieppe, sailing to "Trapobane," *i.e.* Sumatra, found the deviation there to be 35½° E. He is uncertain, however, whether there was a steady increase to this value throughout the voyage, or whether the deviation had not passed through a maximum and was decreasing, since the distance in longitude traversed exceeded a quarter of the circumference of the world by 35°, *i.e.* Taprobane lay 125° E. of Ferro. The reference is undoubtedly to the voyage of 1529 to Sumatra made by the Parmentier brothers of Dieppe, on which Pierre Crignon accompanied them, and the deviation of 35½° E. and the longitude 125° E. (less than 8° out) are some of the data upon which Pierre Crignon must have based his theory of longitude: his work was evidently known to Rotz.

The latter's revelation of travel, too, is interesting. It is the Guinea–Brazil route he knows, returning by the Azores: he gives the date of one Brazil voyage, the autumn of 1539, while he also mentions being at sea in 1529. This is just the period of the English Brazil voyages, and as Rotz mentions his residence in England, he may have been employed as pilot by the elder Hawkins or his confrères.*

To return, however, to the observations. Leaving aside the Taprobane figure, Rotz compared the other deviations with the linear (not angular) distances from the prime meridian, on which, so he stated, the deviation was nil. Thus Cap Raz was 480 leagues W. and the deviation there 22½° W.; this gives a deviation of 1° for every 21¼ leagues. The other observations gave varying values up to 24 leagues, but the differences were put down to errors of the charts from which the distances were taken, and 21¼ was accepted.

It is clear from his diagrams that Rotz considered that the needle, wherever it was carried, remained parallel to itself, and to a plane drawn through the prime meridian. Hence if it was taken west, the convergence of the meridians would produce an (apparent) deviation to the west, and similarly, if it were carried to the east, a deviation to the east. At 90° E. or W. the deviation would pass through a maximum, hence the rejection of the Sumatra figure. Sebastian Cabot appears to have had a somewhat similar theory, although he placed his zero line west of the Azores.

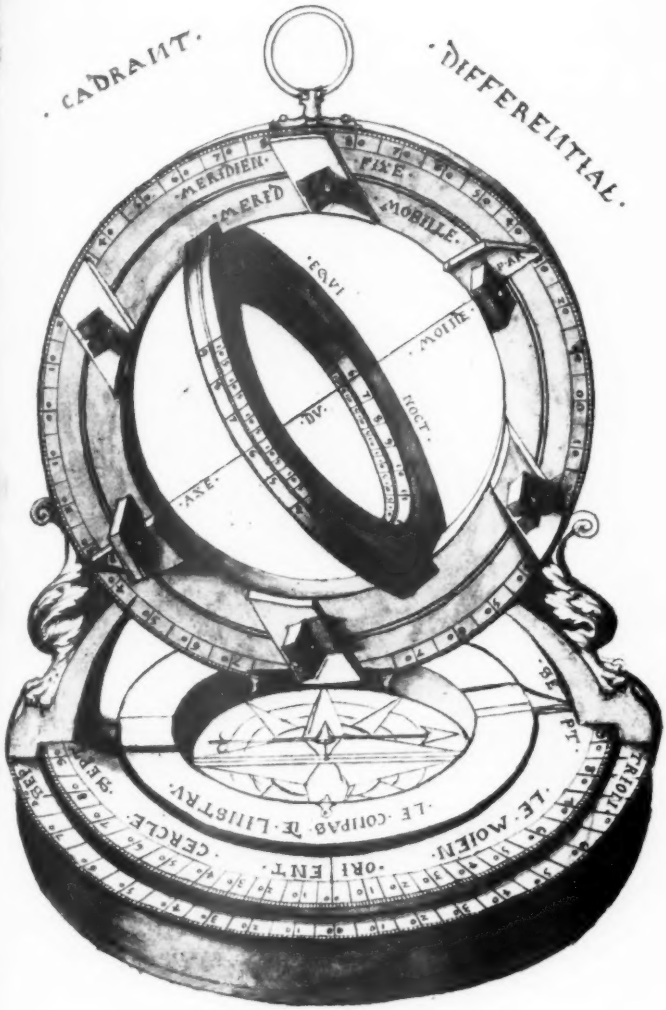
*J. A. Williamson, 'John Hawkins,' ch. i.

That Jean Rotz, even when at fault, was ahead of his contemporaries is clear when we compare his work with the extremely popular Spanish Navigating Manuals of Pedro de Medina (1545) and Martin Cortez (1551). Pedro de Medina, an experienced West Indian pilot, held that the "north-westing and north-easting of the needle" (as it was called) was of little moment, and was associated with the movement of the Pole Star round the pole. He remarks also that since the "virtue" of the compass resides in the needle and not in the rose (i.e. card), it is to be regretted that compass makers do not make the north point of the needle tally with that on the card. This emphasizes a further cause of confusion on which Jean Rotz also dwells. Just as the compass-clock makers of the fifteenth century cut the magnetic deviation on the dial as a matter of course, so the marine compass-makers allowed for it, and as the rose or card was attached *above* the needle, and adjusted so that the north point or "lilly" pointed to the north star, the deviation was not brought to the pilot's notice. Sailing, too, was only to 32 points, and consequently any small variation was likely to escape notice or be dismissed as accidental, *e.g.* the variation as between Dieppe where the deviation was 10°, and London where (according to Digges in 1571) it was $11\frac{1}{4}°$, or just one point east of north.

As and when, however, navigation became more cosmopolitan, a new difficulty was introduced: a compass made in one port, with the local deviation allowed for, did not tally with a compass made in another port, when both were taken overseas. Columbus, for example, refers to the readings of his Genoese and Flemish needles respectively on his Second Voyage. On this point Rotz furnishes interesting details. The Portuguese, for the navigation to Guinea, made compasses corrected for a deviation north and quarter north-east. The Italians, for the Mediterranean navigation, made no correction. The French, Scots, English, and Flemings made needles practically alike, corrected for a deviation north and half a quarter north-east. For transoceanic voyages the French compasses were very variously corrected, and Rotz considered that all such methods were at fault, for since there was a continuous variation from point to point, the only method of determining the true direction of the ship's course was to make frequent comparison between the geographical and magnetic meridians. As exemplifying the errors of current practice, he states that it was the usual experience on the return from Brazil for the master to find himself 70 leagues farther west of the Azores than his reckoning showed, notwithstanding the exactness with which both Brazil and these islands were, so he says, laid down on the charts, as a result of being frequented by people of many countries. Such errors were put down to currents and faulty seamanship, but were due to faults of the compass.

Rotz reiterates that the variation of the compass and the sphericity of the Earth alike determine that the rhumb lines, forming a parallel network, in the marine chart, do not represent true bearings. Hence errors arise in using the charts, and it is very necessary that positions should be fixed astronomically, although he recognizes that not only are the operations difficult in themselves, but the computation requires more knowledge of astronomy than the ordinary ship-master can command.

He gives two supposititious examples of longitude determination, as



The "Differential Quadrant" of Jean Rotz: from the manuscript in the British Museum

UNIV. OF MICH.

follows: "je dycts que le 15e de Janvier 1529, moy estant dessus la mer voulus scavoir la distance de mon meridien au meridien dulme." At sunrise, then, which occurred at 8 o'clock, he took his astronomer's staff "dict par les mariners esbalester" and measured the distance between the sun and moon, finding it 41°. Two folios of complicated calculations follow, and finally, taking Ulm to be in 47° N., 30° 20′ E., the required longitude is found to be 180° E. of Ferro, *i.e.* somewhere east of the Moluccas. Using in the second example the moon and a fixed star, he says, "Moi estant sur la mer veulant scavoir la distance de mon meridien de Dieppe, premierement je rectifies mes ephemerides ou tables dalphonse au meridien de dieppe et puis je regard le vrai lieu de la lune pour ung certaine heure de la nuyt," namely ten o'clock, when he finds it 16° in Taurus, and determines its declination. He also finds the right ascension of the star Aldebaran "aprez toutes rectifications faictes destiez" 2° 18′ in Gemini, and its declination 15° 55′ N. "Et notte ycy ung poinct cest quil est necessite que tu rectifies ton heure par en moyen des equations des heures mis aux tables dalphonse ou aux ephemerides." Again, a couple of folios are occupied by computations, and the longitude works out as 229° 30′ E., or somewhere in mid-Pacific. Rotz does not, unfortunately, give any examples of the observations he would make for determining the variation of the compass, although it was for this his instrument was specially designed.

It appears, from several direct references, that Jean Rotz was a student of the deservedly popular writings of Peter Apian, and especially his cosmography. It is not surprising, therefore, that in the last section of his book he refers to the method of map-making by triangulation, due to Gemma Frisius, and found in his editions of Apian from 1533 onwards. The title of chapter 8 runs: "De la mensuration pour practicquer les longitudes et quantitez des espaces qui seront enter tous les lieux a lenviron de toy, et desquels tu veulx avoir lesdits espaces et mensurations, voyre pour lieu que tu les puisses veoir, et ce par angles sans calcul et par deux stations seulement."

After describing the method and drawing the diagram as in Frisius-Apian (although without reference to particular places), Rotz adds, "Et davantage tu doits scavoir que ceste maniere de faire seroit tres necessaire et utille pour la composicion de quelque carte terrestre, tant pour la scituation de tous les lieux, places villages, chasteaux, et villes et citez que lon voudroit escrivre en icelle selon la latitudes par lesquels seroient trouvez les unes et les autres."

This Dieppe seaman had no reason to complain of his personal reward at the King's hands. He was taken into the royal service, and described himself as "servant of the King" in the Boke of Ydrography (written in English), the preparation of which was his first official duty. At Michaelmas in 1542, he received a payment of £20, being one-half of an annuity of £40, then a very considerable sum,* while on October 7 of the same year† he was granted papers of denization for himself, his wife and children. Here he is described as "native of Paris," and as he speaks incidentally of having given two years to the study of nautical problems, he may have retired to that city from Dieppe in 1540.

*Letters and papers of Henry VIII, vol. 17, g. 880, fol. 426.
†*Loc. cit.*, Appendix A, 20.

AN ENGLISHMAN IN MECCA

THE HOLY CITIES OF ARABIA. By ELDON RUTTER. Two volumes. *London: G. P. Putnam's Sons* 1928. 9×6 *inches;* xvi+304, viii+288 *pages. Two Guineas.*

AS one of many results of the improvement in communications of the Middle East which accompanied or followed the events of the Great War, the "Island of the Arabs," or at all events the fringe thereof, has inevitably begun to suffer from the sketchy attentions of the itinerant bookmaker—if I may use the word in a literary sense. The more hearty therefore should be our welcome to such a thorough and first-class piece of work as is presented to us in these two volumes, upon the appearance of which author and publishers are alike to be congratulated.

While it is no matter for surprise that friends who have read the book, whether of their own motion or on your reviewer's recommendation, should one and all have coupled their comment with the query, "Who is Eldon Rutter?" it *is* surprising to those who for decades past have been acquainted with the geographical and political history of the Middle East, that one whose name had never been so much as mentioned in association with that region either before or since the War, should have stepped thus unannounced on to the stage of Arabian travel with such a finished and absorbing tale to tell. Well indeed may they ask, "Who is Eldon Rutter?" and the author will, I hope, permit me to give them a greater measure of enlightenment on the point than his modest pages afford. He is a young Englishman hailing from one of our southern counties, who began very early in life to take a particular interest in books on Arabia and Syria—Burckhardt, Burton, and the rest. His reading was however arrested by the incidence of the Great War, in the course of which, though still under age, he joined up as a trooper, and it was not until 1919 that he found himself able to resume the strings of his hobby. Then, with a keen ambition at the back of his mind to attempt the Mecca pilgrimage, he set himself down to the serious study of Arabic, and a few months later accepted a post in the Malay States, where there are large settled communities of Arabs, mostly immigrants from the Hadhramaut, among whom he learnt to speak the language fluently. Returning home in 1924, with the urge of the Mecca project still lively within him, he proceeded to Egypt, where he lived as a native until he felt so thoroughly at home in the language and well versed in the rites and traditions of Islam as to be confident of his ability to carry through the pilgrimage as a fully fledged Muhammadan. But fortune seemed by no means inclined to smile on him at the start; a young Arab friend, of Mecca, whose acquaintance he had made in Cairo and who was to have been his companion on his travels, dying a few days before the date fixed for their departure. Moreover, at this particular juncture—May 1925—hostilities were in active progress in the Hejaz between the Sharifian Ruler and his formidable rival Ibn Sa'ud, the Wahhabi Sultan of Nejd, and at the moment Sharif 'Ali was being actively besieged in Jidda, while Medina and Yembo were likewise invested by the Wahhabi forces. Mecca itself had already succumbed. Thus, to all outward seeming, a more unfavourable season for a European to attempt the pilgrimage could hardly have been imagined. Nothing daunted, however, our author determined to adhere to his long-cherished plans, but wisely decided, in the circumstances, to avoid the ordinary route via Jidda; and leaving Suez for Massawa, where he arrived on May 25, he took passage thence by a dhow sailing for Lith on the opposite coast of 'Asir, four camel stages from Mecca. At Massawa he had fallen in with a couple of "pilgrim guides," a form of black-

mail which it is apparently unwise for pilgrims to dispense with, and they had undertaken to pilot him through to Mecca. In answer to their inquiries as to his nationality he had replied, "My origin is from Damascus, but I have lived long in Egypt." On this point I shall have more to say.

On the eighth day out from Massawa, after a very uncomfortable passage, the opposite coast was sighted at a point which proved to be El Gahm, a small port of 'Asir a considerable distance south of their intended destination; but the wind being contrary for the passage northward, the travellers decided to disembark where they were and proceed onwards by land. On this part of his route, through the Tihama or maritime plain, Mr. Rutter was breaking new ground. Unfortunately, the satchel containing his compass and aneroid had been washed overboard during the crossing from Massawa, so that even had it been possible for him at this early stage to take observations or make sketches without endangering his own safety, he was not equipped for the purpose. Moreover, it must be remembered that the pilgrim season of the year 1925 fell at the hottest period of the year, when in the interest of man and beast caravaning had to be done as far as possible by night. But if he has not been able to add to the topographical details figuring on existing maps, his descriptive writing is excellent, and he gives us vivid pictures of the trials and episodes of the road and the conditions of life in the meagre region through which he passed. Incidentally, it will be noted that at Birk he found the " stock " of womankind curiously at a discount.

Let me revert here for a moment to Mr. Rutter's inspiration to describe himself as a Syrian from Damascus, and offer a few observations on the position, in practice, of a Westerner undertaking the pilgrimage to Mecca—a matter regarding which a good deal of misconception prevails. Provided that he travels unequivocally as a professed and *bona fide* Muslim, he should be, in principle at any rate, just as safe and immune from molestation in the Holy Cities as any oriental follower of the Prophet. On the other hand, it must not be supposed that a mere parrot ability to repeat the Muslim password "There is no God but God and Muhammad is the prophet of God" is sufficient to enable him to pass muster. To ensure acceptance as a brother Muslim he must also be able to satisfy his company, if occasion arises, of his acquaintance with the prayers, formulas, and everyday usages of Islam. These qualifications our pilgrim evidently possessed to a very remarkable degree, combined too with a scholarly proficiency in the language and a sound knowledge of the laws and doctrines of the faith.

With such an equipment there should have been no *prima facie* need for him to disguise his nationality; but, as he explains, he had a definite object for doing so, namely, to render himself as inconspicuous as possible on the road and so to save himself frequent inconvenience. For, though once arrived in Mecca one and all pass on their merits as Muslim and are alike liable to the ordinary risks of travel in a somewhat lawless community, the Westerner no doubt does run additional risk as such. Our friend "Haji Ahmed Sallah ud Din," to give him his *nom de voyage*, had his full share of such risks and vicissitudes, and to his graphic relation of them we are indebted for some of the most interesting and dramatic pages of his book; for example, when he describes the incident of his dispute with his rascally pilgrim-guide 'Abdullah, or again, when he gives us the picture of his fight with a violent attack of fever and delirium while his ghoulish companion, having purloined his keys, sat awaiting his dissolution in order to rob him of any valuables he might have. Apart from this incident he was not seriously inconvenienced in Mecca even when his English nationality was artlessly exposed on his meeting with a Syrian friend who had known him

for an Englishman in Cairo, and it was as "Sallah-ud-Din el Inglizi" that he was introduced into the presence of Ibn Sa'ud the following day, and received, it need hardly be said, with every courtesy and kindly consideration. It was great good fortune for him that he should have succeeded thus in entering the Hejaz so soon after the capture of Taif and Mecca by the Wahhabi invaders, and his account of his intercourse with Ibn Sa'ud, his clever and to my mind just portrayal of that great personality, and his detached observations on the various aspects of the Wahhabi régime, all combine to endow his book with a special and permanent historic value.

Of Mecca, where he spent nine months in all, in two periods, during the first of which he performed the orthodox pilgrimage, he gives a most absorbing and intimate account of the daily life and customs of the inhabitants both during the pilgrim season and afterwards. Indeed, as he himself tells us, he had regarded his journey most seriously from the moment that he had begun to plan it, and had determined to enter thoroughly into the spirit of the strange life which he had to lead—an ideal frame of mind in which to face his task. Nevertheless, he has to confess, in retrospect, that the circumstance of his daily life in Mecca were not always attractive and were sometimes even "horrible," and those of his readers who know by experience how intolerably irksome after a time becomes the oriental practice of taking meals on the floor and using only the fingers, will the more appreciate the indomitable fixity of purpose which carried him triumphantly through the petty discomforts of those long sultry months and the intense feeling of relief which came to him when at the end of the chapter he took ship for Port Sudan and was able to write, "For the first time for a year I could now eat with a knife and fork!"

Of the Meccans, by whom he was on the whole treated well, he speaks sympathetically and considers that as a community they are not nearly so black as they have often been painted. "During my residence in Mecca," he writes, "I observed less of the obvious signs of indecorum than I have seen in many other towns that I have visited," and he was convinced that this phenomenon was not wholly to be accounted for by the presence of the puritanical Wahhabi.

On 5 December 1925, Mr. Rutter having now been nearly seven months in the Hejaz, Medina surrendered to the Wahhabi forces, and a few days later Jidda followed suit. The road to Medina, the second of his objectives, was now open, but before going there he determined to bring off his long-contemplated visit to Taif. He accordingly set out by the Wadi Yemaniya route and reached his destination without special incident. The oasis, which is principally a summer resort for the people of Mecca, in any case loses half its population in winter, but as a sequel of the Wahhabi invasion in the previous September, he now found it practically deserted. The invaders, he was told, had given no quarter to those who had resisted, and the three or four thousand inhabitants who had managed to keep them at bay on the night of the attack by barricading their premises were rounded up on the following day and expelled from the town, most of them fleeing to Mecca and Jidda. After a week's sojourn, during which he greatly enjoyed the cool climate and the unwonted pleasure of sleeping under blankets, he decided to return to Mecca, travelling this time by the more easterly route over Jebel Kara, which camels are unable to negotiate, and mules or donkeys must be employed. The scenery met with here evidently appealed greatly to our author, and he gives an eloquent description of it; but the extremes of heat and cold made the journey a trying one, and he was thankful to regain the haven of his modest quarters in Mecca "blistered and blackened by sun and dirt."

He now contemplated leaving for Medina by the first opportunity, and all

arrangements had been made for the journey in the company of a party of Medinans returning to their homes, when suddenly on the eve of departure he was struck down by a violent fever which kept him prostrate for several days and left him in a state of great weakness. It was during this visitation that the sinister incident occurred to which I have referred earlier in this review. His strength returned but slowly, but he refused to be turned from his fixed purpose not to leave the country without visiting Medina. This, be it understood, is not an obligatory part of the pilgrimage, but in practice veneration for the Prophet and the hope of earning his intercession on the day of resurrection prompt all who can bear the expense and hardships of the long caravan journey to undertake the visit to his Town and Tomb. Incidentally we learn from Mr. Rutter that the Wahhabis, to whom veneration of the tombs of saints in general is anathema, now impress on pilgrims that it is only in order to pray in the mosque that they are permitted to enter Medina, and not to visit the Prophet's tomb.

The traveller's latter days in Mecca were full of interest, and when the time at last came for departure we can well understand that it was "not without a pang that he passed from the strangest of all the cities of the world." He was still very weak, and so arranged to share a "shugduf," or camel litter, with the leader of a party of Egyptians with whom he travelled, the route taken being Rabigh—Bit Husani—Bir es Shaikh—Medina; and though the fever clung to him for some days, the clear and cool air of the countryside gradually restored him to health and enabled him to interest himself as was his wont in the daily life of the caravan, tiny link as it was in an endless chain of winding camels, extending as far as the eye could reach. Arrived outside Medina the party were waylaid by the inevitable pilgrim guides, and our author was taken possession of by a Moor from Algiers by whom he seems to have been well served. The time of his arrival being just before the beginning of the pilgrimage month Dhu'ul-Hijja, Medina was fast emptying of its passing population, candidates for the coming Hajj having to rally at Mecca for the opening. Meanwhile Mr. Rutter settled down to the study of the town of Medina and places of visitation appertaining to it, and gives us a valuable *résumé* of what he saw and learnt. By the seventh of the month, corresponding to June 18, he had completed his task to his satisfaction and was once more ready for the road—this time the last lap—Medina to Yenbo' (or Yanbua, as he calls it), a short journey of five caravan days. The heat became more and more intense and oppressive as he once more descended into the maritime plain and approached the Red Sea coast, and a sojourn in Yenbo' at such a season was no prospect to contemplate with unconcern, but here fortune favoured the tired pilgrim, a Khedivial mail steamer entering port the morning after his arrival. He lost no time in taking ship by her to Port Sudan, and thence proceeded onward by train to Khartoum and Cairo. Thus ended a great enterprise, carried through with consummate pluck and fixity of purpose, and now given to his countrymen in two absorbing volumes which leave nothing to be desired either in literary style or human interest. Entering the lists so admirably equipped as Mr. Rutter has, we may fain hope, in congratulating him on his success, that the Hejaz and the Island of the Arabs have not heard the last of him. P. Z. C.

ENGLISH RIVER NAMES

ENGLISH RIVER NAMES. By EILERT EKWALL, Professor of the English Language in the University of Lund. *Oxford: Clarendon Press* 1928. 9×6 *inches;* xcii + 488 *pages.* 25*s*

WHATEVER criticism may be passed on details contained in this book, this at least must be said of it, that it is the result of amazing, if not always successful, research, and that it is a work which for a long time will be of great value to those who are engaged in the study of the origin of English place-names, as well as to those who have a general interest in British archæology. The author's previous work on the Place-Names of Lancashire had made it clear that he was well equipped for inquiry into British topographical nomenclature.

The river names of this country may be divided into three classes : those of Saxon origin ; those of Celtic origin ; and those which have an origin which is apparently neither Saxon nor Celtic. It is with regard to the last class that those who have studied the origin of stream names in England might be most disposed to contest Professor Ekwall's conclusions.

Every one acquainted with English nomenclature will be aware that it is in the case of stream names especially that survivals of names of Celtic origin are to be found. Save in Cornwall, they are rarely associated with human habitations —towns, villages, hamlets, and so forth. It is true that a fairly large number of Celtic place-names are found in Cumberland and Westmoreland ; a certain number within the area of the old kingdom of Elmet in the West Riding of Yorkshire; a few in Devon, Somerset, and Dorset; and very few indeed in other counties, except in the western regions of Hereford and Shropshire, regions which were ethnographically part of Wales.

It is a part of the tradition of the Saxon settlement in this country that the new-comers tended to avoid previous centres of population. This tendency seems to have been due to the fact that they were a people devoted to arable agriculture, and were therefore forced by circumstances to live in the neighbourhood of the land they cultivated, in centres of population which, under the original economic circumstances of the settlement, never exceeded the size of a modern village. That the pre-existing Celtic population was to a certain extent engaged in agriculture is known from those records of the Roman imperial times which speak of Britain as a source of a certain amount of corn supply; but it is quite certain that they were not a people which cultivated every usable acre of Essex as arable land, or in Gloucestershire ploughed an area two and a half times as large as that under the plough in the same county at the present day. The vast majority of the centres of population set up in this country by the Saxon invaders must have been on sites previously unoccupied and unnamed ; so that it is not after all very surprising that Celtic names disappeared.

With the river names it was different. The Saxon settlers picked up from Celtic survivors their names for the majority of the big rivers of this country, and the names, too, of many streams of quite small size. Some of the latter disappeared in post-Saxon times, though they were the names actually used by the Saxons of the last centuries of the Saxon age in this country. The extent to which the Romano-British inhabitants were destroyed by the Germanic invaders is much disputed. In the districts first conquered the destruction was no doubt large, for the resistance was fierce. But when it came to later expansion of the Saxon area, the resistance had weakened, and the settlement did not in all probability entail anything of the nature of a massacre. But that there was some survival of the Celtic element even in the districts first conquered is shown by

the main river names of such counties as Hampshire and Kent. Had the Saxons merely heard them on their first arrival, and had those who used them perished within a short time, it is most improbable that the names should have survived. It took long association to establish a topographical name in an age which knew no maps. It could take several generations of association with the Celts for such river names as *Icene* (Itchen) and *Terste* (Test) to become permanent among the Saxon settlers on their banks.

The Romano-British population of the province of Britain must have been predominantly Celtic—in name, at any rate. The only foreign element would be that supplied by settlers from Italy and the western provinces of the empire, and by a miscellaneous but small percentage of other foreigners who served in the legions and auxiliaries which formed the garrison. The total foreign element which settled in the country must, even in the latest days of the existence of the Roman province, have been but a small fraction of the total population. But the matter does not end there. In order to form a true conception of the population of Britain in Celtic times it is necessary to take into account the nature of Brythonic Celtic conquest and settlement in other parts of the world.

It is known from literary sources that the Celtic conquest and settlement of Galatia in Asia Minor resulted in a political unit in which a Celtic military minority dominated a native population which it exploited as cultivators of the soil; and that this Celtic element retained its military character long after the conquest, affording a means ready to hand for any one who could hire it for war purposes in the stormy days of the early Seleucids. The modern ethnography of France would be quite inexplicable on the assumption that the population of Gaul in Cæsar's time was mainly Celtic. The French are a black-haired race, except in Normandy and Burgundy, where large Norse and German settlements have affected the hair-colouring of the population. The universal testimony of antiquity is that the Celts were a light-haired race, which means, at any rate, that they were not black-haired. The ethnographical evidence makes it clear that the modern French are descended in the main from a black-haired race; and in those parts of Gaul north and west of the Rhone that race can only have been that Iberian race which in Cæsar's day still maintained its political freedom to the south of the Garonne. East and south of the Rhone the aboriginal population was that Ligurian race which was largely represented in North Italy in historical times.*

That this Iberian race was, so far as is known, the aboriginal population of Britain, or at any rate of England, is admitted. Several centuries after the Celtic conquest it still survived in a pure form in South Wales—that tribe of the Silures which Tacitus recognizes as a tribe distinct from the Celts of what is now Wales. The whole idea of the Celts in conquering a new region was, not to exterminate the previous inhabitants and work the land with their own hands, but to use the conquered as tillers of the soil. The probability that these aborigines survived in large numbers in England is suggested by the fact that the Celtic centres of population were largely hill forts or camps, those fortified earthworks which survive in such large numbers in England. It is reasonable therefore to assume that large numbers of the previous inhabitants survived in Celtic Britain mingled with the conquering race; and in one district at least, that of the Silures in South Wales, resisted the Celtic domination. By the time of the Roman Conquest three centuries at least had passed since the conquest by

* Cæsar, in his 'Gallic War,' recognizes only the Celtic population of Gaul, partly because it was the warrior class which fought him, partly because, north of the Garonne, Celt and Iberian must have become partially merged in one composite race in the period, not less than six centuries, which had elapsed since the Celtic settlement.

the Brythonic Celts; and, when Claudius conquered the south-eastern part of the island, the two races were probably more or less merged in one.

It is also probable that the percentage of the original race which survived the conquest of Britain by the Celts was much larger than that of the Celtic race which survived the later Saxon conquest. Since the Celtic survivors passed on to the Saxon settlers a large number of their own river names, it is, to say the least of it, probable that the Iberian population passed on to the Celts some of the river names of pre-Celtic times.

It is again probable that this Iberian people of Britain spoke a language akin to that of the Iberian race of western Gaul, and to that of the Iberian race which formed the majority of the population of Spain. Unfortunately, no real clue as to the nature of that language has come down to the modern world. There is, indeed, a "corpus" of Iberian inscriptions. But the inscriptions themselves are so brief and fragmentary that they do not afford the most persistent and skilled inquirer any clue as to the nature or vocabulary of the language. Exploration of the Basque tongue might have been expected to offer a fairer prospect of information; but the conclusions which expert explorers of it have drawn are so variant that they afford no sure aid to the inexpert. It is not therefore possible to say of any river name in England, the origin of which is not Saxon and not obviously Celtic, that it contains a root or roots which show similarity to roots found in any Iberian tongue, since there is no surviving element of that tongue to which to appeal. Yet despite this, it is practically certain that some of the English stream names are rooted in that tongue.

But Prof. Ekwall seems to reject such a possibility. On p. lv he says, "I cannot point to any definite name that strikes me as probably pre-Celtic." The consequence is that some of his derivations from Celtic roots are, to say the least of it, disputable. But it is fair to add that when he is in doubt he makes no secret of the fact; so that his reader need not be misled. Some Celtic scholars might perhaps feel that he has relied too absolutely on Prof. Watson's work on the 'Celtic Place Names of Scotland,' a book which, though excellent in many respects, excites at times the wrath of specialists on the Gaelic branch of the Celtic language.

But it must be admitted that any reviewer who attempts detailed criticism of Ekwall's work is up against a mass of evidence which has been collected with enormous diligence, even if the interpretation of it be not always convincing.

In dealing with the large mass of evidence derivable from the Saxon charters the author is at times remarkably successful in his interpretation of difficult points. But there are every now and then errors due to the misinterpretation of the charter material, or to a rather perverse rejection of topographical matter of the truth of which there can be no reasonable doubt. The detection of such errors by those who are acquainted with the actual facts is apt to leave the reader with an uncomfortable feeling that such errors may be present in other cases of which he is unable to form a judgment.

If such a review as this is to be of real value to those who may use Prof. Ekwall's book, it should supply at least two categories of information: suggestions as to emendations of the matter in the book itself; and any additional matter relating to the subject which happens to be known to the writer. I propose therefore to deal in the first place with certain statements in the book itself, prefacing what I have to say with the admission that it is only in the case of those names which occur in the Saxon charters that I can speak from something like intimate knowledge. The names here commented on may be taken in alphabetical order, as in the book itself.

Ann (Hants.), p. 15. The author ascribes this name to Pillhill Brook to the west of Andover. That is right as far as it goes. What he does not know is that

the four villages on the brook, Monxton, Amport, Thruxton, and Abbot's Ann, were all called Anne, Anna, or Ann in former days. But Ann was not merely the name of this brook, but also of that which flows through Andover, a stream which he calls Anton (p. 15), and also of the joint stream formed by this and Pillhill Brook. The name Anton never existed as the name of either of these brooks. He ascribes the name of the village of East Anton to the error which associated the stream near which it lies with the Antona of a corrupt passage in the text of Tacitus. This is putting the cart before the horse. It was because of the existence of the name East Anton in this neighbourhood that the Tacitean Antona was identified with that stream which flows near it—an absurd error which was shown up by the late Dr. Henry Bradley. East Anton is "the village on the East Ann," where the term "east" is used to distinguish the stream near the village from Pillhill Brook which was the West Ann.

Bedwyn (Wilts.), p. 30. The author's argument with regard to this name is perverse. He follows Ekblom (Pl. N. Wilts.) in deriving it from *bedwind*, "convolvulus," which may be true. But he goes on to say that it is a back formation from the village name Bedwyn. Can any one who knows anything of place-names in Southern England suppose that a village name of such a character would be independently evolved in Saxon nomenclature? Of course the village is named from the stream, not the stream from the village. It is quite possible that the stream name was due to the growth of convolvulus on the banks of the brook. His quotation of the *Broyl of Bedewynde* from an IPM. of 1294 as an argument for the name having been applied originally to a wood is incomprehensible. It is of course a reference to a wood in the parish mentioned in connection with the property of the deceased.

At the end of the note is the statement: "The old name of the stream may be *Cymenesdenu* or *Forsca Burna*." One is inclined to ask what the author means by citing *Cymenesdenu* as a possible stream name. In the charter referred to (CS. 225, CD. 133) the landmark runs: "Ab oriente vallem vocatam *Cymenesdenu*." Also *denu* is never used as a stream name in the charters, either in composition or otherwise. *Forsca Burna* is a tributary of the *Bedewinde* of the charter.

Cad (Som.), p. 58. Prof. Ekwall quotes *Caducburne* from a Muchelney charter which he describes as doubtful or spurious. What "spurious" means as applied to that charter it is difficult to say, except that the survey is not of the professed date of the charter. But the *Caduc* element has probably nothing to do with the personal name *Cada*. It is much more probable that it is one of those *-uc* stream names found elsewhere. There is a *Fiduc*, which is a stream near Taunton.

Chynd (Worc.), p. 80 (*Cionda* or *Ceonda* of two charters, CS. 123 and CS. 1282), is a stream crossing the west boundary of Yardley, near Birmingham, about ¼ mile north of Warstock House.

Evenlode (Gloucs., Oxon.), p. 157. The author relies evidently on the account of the name given in Mawer and Stenton (Pl. N. Worcs.). He says, "the first element is a personal name. The second OE. *Gelad* appears to mean a passage." The modern river name is, he thinks, a back formation from the village name Evenlode. That the name as now applied to the whole river down to its junction with the Thames is such a formation is no doubt correct; but the question is as to the origin of the name Evenlode itself. *Eowa* is indeed found as a personal name. But *Eowa* occurs as a river name in charters 1 and 2 of the Crawford Charters (Napier and Stevenson). Those editors identify it with a river Yeo in Devon; and the identification is almost certainly right. It appears also as a stream name in CS. 466 and CS. 964 in reference to a brook at Tadmarton in Oxfordshire.* It is, to say the least of it, probable that this *Eow(a)* or

* In the latter of these two charters the copyist has written the name *Coppan*

Eow(e) of the Oxfordshire charter is the same as the Eowe of the charter of Devon. Is it not, in fact, a variant spelling of Yeo or *Yo* with the simple meaning of "river"? May not the same be the case with the original form of the name Evenlode? The extant charters in which the old name of Evenlode appears are uncertain in their spelling of the first element of the name, and sometimes insert an "l"—*Eowlan*—instead of *Eowan*. But the modern name shows that the "l" was a copyist's error repeated by later copyists.

As to the meaning of *gelad* or *lad* it is only necessary to refer to Prof. Ekwall's own notes on those terms, where he says that they could refer to an artificial side channel of a stream. Even now the words "lead" and "leat" are applied to such channels. There is such a channel at the present day just north of the village of Evenlode. Moreover, in the charter CD. 963, which is labelled *Dageles-forda*, but is as a fact a charter of Adlestrop, there is reference to a "vetus amnis de Bladene" (*i.e.* the Evenlode river), which implies a later and probably artificial channel a mile or two below *Evenlode* village. Both the old and the later channel exist at the present day at the point to which the Saxon survey refers.

Gill, p. 171. It is worth noting that this essentially northern name is found twenty times as a stream name in a long narrow region running all along the southern boundary of Kent. A few examples are: Bilton's Gill, Peartree Gill, Sparkes Gill, etc. Their distribution is well marked and significant. They are all near the Sussex border, extending from the Surrey boundary to the neighbourhood of Romney Marsh. They are none of them north of the line of railway which runs from Edenbridge through Tonbridge to Dover. As the Saxon charters of Kent show, this area of the county was in the time of those charters within the bounds of the forest of the Andredsweald. In Hampshire two stream names of Scandinavian origin are found in the south part of the former region of the New Forest, slight memorials, it may be, of Scandinavians who were left behind after some raid up Southampton Water. May the existence of this northern stream name in the north fringe of the Andredsweald be due to Scandinavians left behind by some raiders who made their way up the Lympne river? The area over which they are spread forbids the hypothesis that they might have been introduced into the region by landowners or farmers from the north who settled here in comparatively modern times.

Ginge Brook, *Lockinge Brook* and *Wantage Brook* (*Wanetinge*) (Berkshire), pp. 172, 257, 433. The author supposes that the first elements of these names are personal names. The late Professor Bradley emphasized the fact that in the charters these three names are usually spelt *-inge* as the second element. He regarded that ending as non-Saxon.

Humber, p. 201. In addition to the streams of this name given by Ekwall may be added: *Humber*, CS. 112, CD. 49.

Stede (CS. 816, CD. 406). This is the stream which enters Redlake River at the north-east corner of the parish of North Wootton, 4 miles north-east of Glastonbury, Som.

Hyrel (CS. 917, CD. 436). In an appendage to this charter a *Hyrel* is mentioned three times: *th' hit cymth to Hyrel: thwryes ofer Hyrel; north ofer Hyrel* ("till it comes to Hyrel; obliquely over Hyrel; north over Hyrel"). The form and nature of the references point to its being a stream name, and to its being the name of the uppermost course of the River Ebble in the parish of Alvediston, Wilts. Hyril is the name of a field on the north bank of the Ebble at this point.

Idover (Wilts.), p. 208. Is it not probable that the stream was named from the *ig*, of *Dometes Ig* or Dauntsey, and that the original form of the name was *Igdofer*, "Island Stream"?

Wylian Broc and *Eoppan Wyllan Broc*, where the "p" is mistakenly written for "w," an error very common in the charters; and "C" is an obvious error for "E."

Kibble Ditch (Berkshire), p. 230. Prof. Ekwall's explanation of the name of the stream seems somewhat laboured. There are plenty of streams named after personalities real or imaginary; and this *lacu* was probably named after some real or imaginary woman.

Lacu, p. 234. Of this Prof. Ekwall says: "OE. *lacu* is still used in southern dialects, where lake means "a brook, rivulet, or stream; a dried-up watercourse in the moors" (EDD.). This is right, so far as it goes, except that in the field and local names of Kent, Hampshire, Berkshire, Oxfordshire, Worcestershire, Somerset, Wiltshire, and Dorset (I) "lake" never has the last meaning ascribed to it by the Dialect Dictionary. Only in Hampshire is it still used as an uncompounded term applied to streams of slow current.

Lent (Wiltshire, Berkshire), p. 249. Prof. Ekwall says that the Lenta (or Lent, as he calls it) is not the stream at Hinton Marsh Farm. This stream is on the boundary of Wanborough, but not on that of Little Hinton. The *Lenta* is mentioned as part of the boundary of Wanborough, but not of that of Little Hinton : whereas a stream called *Smite* or *Smita* is mentioned as on the boundaries of both. In other words, the *Lenta is* the stream at Hinton Marsh Farm, and the *Smita* is the upper part of what is now called the Cole. Lower down in Watchfield, Berks., the Cole is called *Lenta*.

Little River (Somerset), p. 257½. The *Likelan* of CS. 606 is on the eastern boundary of Wrington parish, miles away from the Little River.

Lox (Somerset), p. 267. The author supposes the Lox of CS. 814 to be the same stream as that of CS. 670. The latter is, as he says, south of the Avon. The former name survives in the form Locksbrook in the parish of Weston, north of the Avon.

Rother, p. 347, and *Shire*, p. 362 (Hampshire, Sussex). The author mentions the identity of these two streams; but there is some evidence he does not quote. The main river is the *Scir* of the charters quoted. But in CS. 982 there is mention of a *Rythæres Heafod* which is called *Hrithres Heafod* in CS. 377; and this landmark is at the head of a Rothercombe, down which flows a stream which is one of the upper affluents of the present Rother. It looks as if a forerunner of the modern name of the river was the name of this branch of it in Saxon times, and that in later times it came to be applied to the main stream.

Wase, p. 437 (note 2). This note contains more than one mistake, and evokes the disquieting feeling that his topography of those parts of England with which the reviewer is not acquainted may be untrustworthy. In the first place, the identity of the *Wase* or *Waese* with Appleton Brook is clearly established by the cross references in the charters quoted, especially in those of Fyfield which contain a most unusual number of names which survive in modern forms at the present day. Secondly, the Osse Ditch of the Appleton field names is the upper part of that brook. Also the Ouse Ditch of the Buckland charter is certainly the *Wase* or *Wasa* of that charter. If then there is no connection between the ancient name *Wasa* or *Wase* and the Osse or Ouse of these field names, the coincidence of the two connections between them is a most curious and remarkable one. Neither in the Appleton (Eaton), nor in the Fyfield, nor in the Buckland case is the *Wase* landmark anywhere near the Thames, as may be seen by any one who looks at the map ; and therefore it cannot be applied to marshy land in the neighbourhood of that river. The identity or connection of this name *Wase* with Osse or Ouse is no doubt very inconvenient to the author's theory as to the meaning of both the ancient and the modern terms.

Wellow (Somerset), p. 447. The author has omitted to quote fron CS. 200, the reference "juxta fontem magnum quem vocitant *Wielea*." If this is a reference to the stream, then it appears significant. The meaning would seem to be "River from the Spring"—the spring being presumably one which was cele-

brated in the neighbourhood. This raises the question whether the second element in the name Wellow may not be the *eow* form of *ea* and *yo* discussed under the name Evenlode.

On p. 467 the author says, "In BCS. 875 occurs *andlang Wusan* in the boundaries of Overton, probably the village of that name in Wiltshire. Overton is on the Kennet, and it can hardly be doubted that Wusan refers to the Kennet." The charter is of Overton in North Yorkshire; and the *Wusa* is the Yorkshire Ouse.

Of course Prof. Ekwall has not included in his book several hundred old stream names of obvious Saxon origin and, generally speaking, of obvious meaning, the names and identities of which are known from the Saxon charters, or other ancient sources. The addition of these would not have added greatly to the interest of the book, and would have doubled the size of it. But there are certain stream names in the charters which he has not included, as far as can be judged from his alphabetical list and from the not altogether perfect index attached to the book. It may be of advantage to those who are interested in the subject to mention briefly the streams omitted.

Amman Broc(es), CS. 1110, CD. 511. Large brook in Inkberrow, Worcs. Cf.
Amman Wyll, CD. 1151, in Blewbury, Berks.
Birninge, CS. 768, CD. 389, in Buckland Newton, Dorset.
Brunn(an), CS. 1269, CD. 1270, in Stoke-by-Nayland, Suff.
Cumbra, (a) CS. 787, CD. 1115, in Burghclere, Hants: (b) CS. 360, CD. 627, in Hartlebury, Worcs.; (c) CS. 1282, CD. 570, in Chaceley, Worcs.
Cynnuc, CD. 1290. Now Chinnock Brook, near Yeovil, Som.
Cunec, CS. 550, CD. 1065, and CS. 610, CD. 1083. Probably stream in Norton Fitzwarren, Som.
Cunuc, CS. 1001, CD. 364. In Bathford, Som.
Dosaburna, CS. 1319, CD. 597. In Froxfield, Hants. Celtic name.
Falet, CS. 22, CD. 984. Near Whittlesea, Lincs.
Hyrn, CD. 1318. In Horton, Dorset.
Limen(an), CD. 978. Possibly in Branston, Leics.
Slaew, CS. 894. In Thornton, Dorset. "Slow," "sluggish."
Talleburna, CS. 899, CD. 1168. *Tealeburna*, CS. 907, CS. 1121, CD. 1247. Now Stutfield Brook in Vale of White Horse, Berks.
Temedel, CS. 1282, CD. 570. In Leigh, Worcs. "Little Teme."
Tenet, CS. 1212. In Tenterden, Kent.
Teofunt(en), CS. 1138, CD. 513; *Tefunta*, CS. 500, CD. 284. In Teffont, Wilts.
Thescuf, CD. 984, CS. 22; CD. 733. Near Peterborough.
Sidinic, CD. 641. In West Tisbury, Wilts.
Tresel, CD. 550. North and west of Wolverhampton, Staffs.
Wret, CD. 706. Tributary of the Biss, Bradford-on-Avon, Wilts.

It is very unlikely that any reviewer could be found who had a knowledge of English river names wide enough to cover the ground covered by this book. The present reviewer, for instance, cannot speak with knowledge of more than about 40 per cent. of the names with which Prof. Ekwall deals. Of that 40 per cent. the book gives much information which is interesting and correct; and the acquisition of some of it argues great acuteness on the part of the author. But, as has been said, his arguments are sometimes perverse, and often unconvincing. Were a reader to count the number of Celtic terms cited by Prof. Ekwall as meaning or implying "winding," and were he to accept all the explanations which the author founds on these terms, he would be driven to the conclusion that the Celtic language was richer in synonyms than all the other languages of the world put together. G. B. G.

THE OLD COTTAGES AND FARM-HOUSES OF NORFOLK. By CLAUDE J. W. MESSENT. *Norwich: H. W. Hunt* 1928. 10×8 *inches;* 248 *pages;* 112 *pen and ink illustrations by the author.* 10*s*

This book to some extent supplements Mr. Basil Oliver's 'Old Houses and Village Buildings in East Anglia' (1912), which favoured Suffolk at the expense of Norfolk and entirely neglected the clay lump, hard chalk, and carstone types. These are all treated at length in the present volume. There is an especially interesting account of clay-lump construction, which is still used in modern housing schemes, though now covered with cement instead of the old clay slurry tarred, sanded, and coloured. Most of Norfolk is on the chalk, and the harder beds and the flints (including the rounded pebbles of the seashore) are used extensively in building but do not in themselves allow much scope in design. Luckily there are good brick clays, so that quoins can be formed in brickwork; and there are many finely designed buildings of all sizes entirely in brick, often showing the influence of the Low Countries. Norfolk had no forests and is consequently poor in half-timber work. The brown carstone which appears in the pretty little cliffs at Hunstanton is used in old and new buildings in the west of the county. But the most attractive walling is formed of a judicious blend of three or four of these materials, brick, chalk, flint, and carstone. It is a great pity that Mr. Messent did not give us some careful (even measured) details showing the ingenuity used in designing such walling. It must be confessed that his sketches hardly do justice to his attractive subjects, and often leave a doubt as to the materials of the buildings. The charming bow-windows found in many village streets and the delightful dovecotes of the manor-houses are very poorly depicted. The photographs and measured drawings in Mr. Oliver's book constitute a much more valuable record. J. H. R.

ESSAI D'ATLAS STATISTIQUE DE LA XI^{e} RÉGION ÉCONOMIQUE. Par H. BRENIER. *Marseilles: Chambre de Commerce* (*Bourgeat Frères*) 1927. 20×15 *inches; maps and diagrams*

This atlas is composed of a collection of elaborate map diagrams and graphs illustrating the local products and trade of the seven south-eastern departments of France. There are two relief maps—one of Corsica and one of the mainland departments—and map-diagrams of population density and movements, by cantons. The diagrams of land utilization indicate either the absolute or the proportional area of the land of each unit area, usually the canton, devoted to each important product, but not its location. The majority of the diagrams are simply rectangles or divided circles, and other figures, representing graphically the statistics for this Région Économique published in the statistical reports of the Government and the railway and port authorities. The work of preparing this atlas must have been very great; but it is probable that any one who needs the information which has been so laboriously diagrammatized here will find it more conveniently in the statistical tables of the various official "Annuaires."

C. B. F.

EUROPA. 3. Aufl. EUROPA AUSSER DEUTSCHLAND: gänzlich neu bearbeitet von Dr. ALFRED PHILIPPSON. (Allgemeine Länderkunde hrsg. von Dr. Hans Meyer.) *Leipzig: Bibliographisches Institut* 1928. 10×7 *inches;* xii+576 *pages; illustrations, maps, and diagrams. Marks* 22

The last edition of Dr. Philippson's work was published a quarter of a century ago, and the many changes in the interval, not confined to boundary drawing alone, have necessitated practically re-writing the whole. In planning it, the

author has decided to secure comprehensiveness at the expense of concentration upon selected areas or subjects. Germany is to be treated in a separate volume. He writes in German that is easy to read, perhaps because he makes few attempts at striking generalization or penetrating analysis, but pursues steadily his even, if occasionally dull, course. Sometimes, however, he can make of what might well be but a string of names and figures an interesting and readable section. He begins with a general survey of Europe as a whole, then describes it sectionally, and finally deals with political units at greater or lesser length. This entails a certain amount of repetition, but is useful inasmuch as a self-contained survey of Europe or of any particular country can be read as required. At one point in reading the introductory sections, the present writer turned with curiosity to the title-page to see exactly how the book was described: the 'Allgemeine Länderkunde' of the title certainly seems to require the emphasis on the epithet. Approximately 60 per cent. of the introduction deals with questions of race, history, and economics, and this proportion is maintained throughout. In the ethnological and historical chapters the author does not over-emphasize the influence of geographical factors, and in discussing so involved a subject as nationality he proceeds judiciously. This very moderation, though commendable, unfortunately contributes to make parts of the book rather heavy; thus the account of the present distribution of races is purely descriptive, for obviously, to explain each case would require a detailed historical account. The best of this introduction is the opening analysis of Europe's position, its land forms, temperate climate, and relation to the sea, all favourable to human development.

The introduction reaches a climax in an attack upon the present political geography of Eastern Europe, and particularly on the frontiers of Poland. It is easy to criticize details, for in the formation of a new state the various considerations, ethnological, historical, and economic, must sometimes conflict, and it is surely an exaggeration to liken, in view of Russia's attitude, the present settlement imposed on Eastern Europe by the Western Powers to the taking of Constantinople in 1204 by the pseudo-Crusaders. It is generally admitted also that political sub-division and the resulting economic barriers are a handicap in commercial competition with the United States, but it may surely be pertinently asked whether the great states of Western Europe have set a very striking example to the East in this respect. The author does not refer to the movements of population that are overcoming the more serious defects of the settlement; for example, the large exchange of peoples between Poland and Germany, and, more organized, between Greece and Turkey. He also omits the allied question of intra-European migration, e.g. the considerable Polish, Spanish, and Italian influx into France.

To the British Isles considerable space, in the circumstances, is devoted, and this chapter may be taken as typical of the sectional treatment. There is of course no opportunity to develop the regional side, and the author is practically content to emphasize the broad division in England between the south-eastern chalk lands and the older highlands of the north-west. Here, however, apart from a tendency, perhaps not entirely avoidable, to fall at times into a guide-book style, he succeeds, with the aid of physiographical and geological maps, in giving an adequate, condensed description of these islands. The influence of the topography upon the distribution of rainfall might, however, have been made clearer. Where, as in economic geography, present developments are more difficult to elucidate, more criticisms may be sustained. For example, there is no reference to the present tendency for industry to migrate from the north to the southern counties. There are also minor points for criticism. The first English railway did not connect Manchester with Liverpool. The assertion

that the humidity of the climate was a deciding factor in the location of the Lancashire cotton industry is again repeated. In discussing the growth of London no mention is made of the final factor in its position, the low gravel-topped hills upon which the City grew. (The scale of miles on the sketch-map is ten times too great.) The plans of the great cities might well have been replaced by maps showing their geographical positions. The decline of the population of Ireland since the middle of the last century is not attributed to its principal cause, the competition of the wheat lands of the New World, which caused much agricultural land to go out of cultivation, with a corresponding decline in population. On the general question of the position of Britain to-day, the view expressed is that common to most recent German writers, that since the war she has declined from her previous unchallenged position, to one of dependence upon the United States and France.

The volume is illustrated with well-selected photographs and coloured maps. An appendix contains statistical tables for each European country, and short bibliographies, chiefly of German works and rather patchy. G. R. C.

LITAUEN. GRUNDZUGE EINER LANDESKUNDE. Von Dr. HANS MORTENSEN. *Hamburg: L. Friederichsen und Co.* 1926. 9×6 *inches;* xiv+322 *pages; illustrations and maps*

This thorough and comprehensive work should, if used with the new map of Lithuania compiled by R. Friederichsen and Dr. K. A. Ozelis in collaboration with the present author, go far to remedy the existing general ignorance of the conditions and outlook obtaining in this small new republic.

This book is far more than a general account of the country's geography in the ordinary sense, because the author himself spent some time travelling up and down the land, staying, as was necessary in a region so destitute of hotels, with whomsoever offered hospitality, whether peasant, priest or what not, thus obtaining not only a deeper insight into local conditions than is usually possible, but also considerable knowledge of the interests and aspirations of the people even in the remoter country districts. The first and more general part of the book (178 pages) deals with the solid geology, climate, surface features, fauna and flora. It is followed by a brief historical review, an account of the various nationalities, with carefully compiled statistical tables, and—which is really the most interesting and original section—a review of the progress of human settlement in the region, with the types of communities, the evolution of the house, and the manner of its grouping into closed villages, country towns, market towns, and main towns. An account of the development or lack of development of roads and highways, also railways, is then given, with a chapter each on agriculture and forestry, the two staple industries of a 76 per cent. rural population. The second, more specialized, part of the book (pp. 179–314) is devoted to the special regions, these being described in great detail under twelve headings, the valuable observations of an actual eye-witness being frequently in evidence.

The book is illustrated by text-maps and photographs of actual features, and has at the end a pocket containing eight maps. The first of these is specially detailed and valuable, as giving more exact knowledge than has hitherto been attainable of the various stages in the ice-retreat, during the Glacial Period, in that region. E. G. W.

SBORNÍK I. SJEZDU SLOVANSKÝCH GEOGRAFŮ A ETHNOGRAFŮ V PRAZE 1924 (Comptes Rendus du I^er^ Congrès des Géographes et Ethnographes Slaves, Prague, 1924.) *Praha: Geografický Ústav Karlovy University* 1926. 12×8 *inches;* 472 *pages*

The Report of this Congress did not reach us till 1928, a year after the Second Congress held in Poland. It is therefore somewhat ancient history; but a few general remarks on the volume may not be out of place even at this date. In one respect it must appeal strongly to every Slavophil; for it contains documents in all the Slavonic languages except Slovene, Kaszub, and Serb or Wendish. (The paper by Dr. Županić of Ljubljana appears to be in Croat, not Slovene.) Of the 165 papers, which vary in length from a few lines to a dozen pages, 49 are in French, and it may be mentioned that in the summary at the end the titles of all the other papers are supplied with French translations. It is surprising to find so many papers delivered in French at this Congress; for it has been said that, whereas the Latin races can understand each other's languages much more easily when written than spoken, exactly the opposite is the case with the Slavs. Polish, for instance, looks very different from Czech; but Poles and Czechs can converse with comparative ease. Czech is naturally the best represented Slavonic language here, with 55 papers; but Polish is a good second with 31. Then there is a big drop to Bulgarian with 8, Russian and Ukrainian with 7 each, Serb-Croat with 5 (2 in cyrillic and 3 in latin characters), and Slovak with 2, while perhaps most interesting of all because most rarely seen in Western Europe there is one short paper in White Russian. This language is distinguishable by the use of the letter ў where Great Russian would write в, *e.g.* ***W.R.*** ўсеславянскі Кангрэс геграфоў; ***G.R.*** Всеславянский Конгресс географов ("Pan-Slav Congress of Geographers"); and, whereas Ukrainian is emphatically an *i* language, White Russian may be called an *a* language, *e.g.* ***W.R.*** пасля Вялікай вайны; ***G.R.*** после Великой войны; ***Ukr.*** після Великої війни ("after the Great War"). Slovak is distinguishable from Czech by the absence of *ř*, *ě*, and *ů* and the presence of *ľ*, *ô*, and more rarely *ä*.

President Masaryk was Patron of the Congress, and Prof. Jovan Cvijić of Belgrade, Gold Medallist of the R.G.S. in 1920, was President. There were seven Sections as follows (the figures being the number of papers read in each): I A. Cartography, Geodesy, and Geophysics (19), B. Hydrography, Meteorology, and Climatology (25); II A. Geology (16), B. Geomorphology (15); III A. Geobotany, B. Zoogeography (17 in all); IV Anthropogeography and Economic Geography (14); V A. Physical Anthropology and Prehistory (13), B. Ethnography (24); VI Regional Geography (11); VII School Geography (11). The languages were most varied in Section V. Czech predominated in Sections I, II, IV, and VII, while Polish was well to the fore in Section III. Two of the longest papers (as printed) were in Ukrainian, in Section V B. (i) by Dr. F. Kolessa on "Les formes récitatives dans la poésie nationale ukraïnienne" (with some music), (ii) by Dr. O. Kolessa on "Les lignes directrices et les principales méthodes dans les études du folklore ukraïnien." There was also in this Section a long paper in old-style Russian (not Bulgarian) by Prof. Šišmanov of Sofia on Bulgarian ethnography. Among the short papers there is an interesting five-line note in French by Prof. Ivanov of Sofia observing that the name Vardar was given by a military colony of Persian origin in the ninth century to the river Axios, called by the Slavs in the middle ages *Velika reka*, "the great river," which is in Persian *Var* [or rather *Bar*] *darya*. The papers were mostly but not entirely devoted to Slavonic matters; a few dealt with such varied subjects as the temperature of Scandinavia, the fjords of Alaska, a Buddhist monastery in the Hindu Kush, an expedition to Siam, and the economic significance of Spitsbergen. During

the Congress there was an exhibition of historical and other maps; and there were two main excursions, one to North and West Bohemia, the other to Brno and neighbourhood and to Slovakia as far as Tatranská Lomnica. J. H. R.

TRAVELS OF FRAY SEBASTIEN MANRIQUE, 1629–1643. A translation of the 'Itinerario de las Missiones Orientales': with Introduction and Notes by Lieut.-Col. C. E. LUARD, C.I.E., assisted by Father H. HOSTEN, S.J. In two volumes. Vol. II: China, India, etc. (Works issued by the Hakluyt Society, 2nd Series, No. LXI.) *Oxford: University Press* 1927. 10×6 *inches;* xii+481 *pages; illustrations and sketch-maps.* 27*s* 6*d*

The first volume of these travels, which was reviewed in the May 1928 issue of this *Journal*, dealt chiefly with Manrique's journey to Arakan and his return to Bengal and Cochin. The present volume contains the account of his voyages to the Malay Archipelago, the Philippines and China, and back to Orissa (1637–40); his journey from Orissa to Dacca and thence up country as far as Lahore and on to Multan and Tatta (1640–41); and lastly his return to Europe via Afghanistan, Persia and Palestine (1641–43). Certain obscurities and, in one or two cases at least, errors in Manrique's narrative may reasonably be ascribed to the confiscation at Damascus of his maps and papers. He gives little topographical information. In some sections of the long land journey from Multan to Damascus the lack of detail precludes identification of the exact route followed. There is some mistake or omission in describing the route from Qandahar to Farra; and it is evident that he did not visit Sasaram, not only because it does not lie between Allahabad and Agra, as he would have us understand, but also because of the fantastic account he gives of Sher Shah's mausoleum. On the other hand, he expatiates upon his personal experiences, the difficulties and dangers encountered; and of such he had a full share. It is impossible, however, for any one who has spent his life in the East to entertain doubt as to the general veracity of his record; and the Hakluyt Society has done well to add this important translation to its invaluable Series.

The account of the journey from Orissa to Dacca is of special geographical interest from Manrique's explicit statement that the "swift Ganges" (there three-fourths of a league wide) flowed between Musumabazar and Baligata. This is the first definite information we have of the Ganges running in so southernly a course. Baligata is undoubtedly the modern Balighata, near Jangipur, from which an old highway led in an almost straight line to Burdwan; and Manrique must have followed this road. Musumabazar has disappeared; the site was probably covered later by Gangetic alluvium. It is the "Mossibasaar" of van den Broucke's map (*circa* 1658–64) and the "Mossimabasa" of Thornton's map (1703), and is mentioned by Valentijn as situated below Aurangabad and south-west of Suti. Within thirty years (by 1669–70, when de Graaf and Marshall went up the river) the Ganges had retreated northwards, turning eastwards near Suti. Again, Manrique's description of his visit to the ruins of Gaur is probably the earliest account of a visit by a traveller to this famous site. His description of Rajmahal is also unique, as being the only one we have by a European of the then capital of Bengal during the first viceroyalty of Shah Shuja, the brother of Aurangzeb.

In the course of his description of Agra our traveller makes his much-discussed statement that Veroneo was the architect of the Taj. The late Dr. Vincent Smith, who set forth the evidence and rival views thereon in his 'History of Fine Art in India and Ceylon,' was inclined to accept the definite assertion of Manrique, who had every opportunity of learning the facts during his stay at Agra while the work was in progress. Father Hosten, in his note

on pp. 174–77, argues forcibly the case for Veroneo. The Taj was commenced in 1632, and was not finally completed till 1653. That Veroneo was living at Agra before and after the building was started, is established from authentic sources. He died in 1640, a few months before Manrique's arrival, and before the work was half finished. It is difficult to see, therefore, why his connection with the building should be limited, as Col. Luard has suggested, to the mural decorations, as such work would surely be carried out later; nor is it clear why a man of artistic temperament, though not a professional architect, should be incapable of producing a design or model of a monument. As further evidence of Manrique's opportunities for ascertaining the facts may be cited his acquaintance with Father de Castro, who dealt with Veroneo's affairs after his death, and, more particularly, his close intimacy with Shahjahan's chief minister, Asaf Khan, the father of the lady to whose memory the monument was erected. The friendship and confidence entertained towards our author by Asaf Khan is disclosed by several passages, but specially by the unprecedented privilege granted him of witnessing from the gallery the banquet given to the emperor at Lahore, the account of which (pp. 213–20) forms one of the most striking episodes in the book. The account of the "Kingdoms and Provinces subject to the Mogol" (chap. 76) is mostly borrowed from de Laet, who in turn borrowed from Terry as printed by Purchas; but Manrique, like others since, fell into the error of supposing that de Laet's "Gor" was Gouro (Gaur). Gaur was not the name of a province in Mughal times. The old site, abandoned as a capital of the Subadar about 1575, was included within the province of Bengal. It was a mass of ruins in Jahangir's and Shahjahan's days. Nor was Gaur a region full of mountains; nor did the "Persilis" *al.* "Sersilis" river rise in its mountains (see Terry and de Laet). A subject of historical importance, namely, the reasons which impelled Shahjahan to issue orders for the siege and destruction of Hugli, and the fate of the Portuguese prisoners thereafter, is dealt with in chapters 78 to 81. Manrique's record of the events of the period is valuable; and the occasion has been taken of reprinting as an appendix to the volume the very important account by an eyewitness, the Jesuit Father John Cabral.

The notes are generally full, and have involved considerable research and inquiry. The untimely death of that talented officer, Col. Luard, before the proofs had been completely passed, will explain some repetitions and some slips in dates, etc., and in vernacular words. In the Errata to vol. 1 (p. xii) attention has been drawn to some errors pointed out in the sketch-maps in that volume. In the present volume there are some similar mistakes, a few of which may be noted. In the map showing the journey from Harsapur to Agra, Manrique is shown as having gone to Murshidabad, and thence across country to Siripur (quite misplaced; it lay some 25 miles south of Dacca) and Dacca. Manrique, however, did not go to Murshidabad (at that time called Makhsusabad). He seems to have gone to Dacca from Balighata down the river by boat, and returned by boat upstream to Rajmahal and Patna. There is nothing to show that he visited Siripur. There is no such place as "Poyquim" marked between Monghyr and Rajmahal. By "Poyquin," as it is spelt in the text, Manrique must have intended Painti (modern Pirpainti), where the Munger *sarkar* jurisdiction then commenced. In the sketch-map on p. 365, Manrique is shown as having gone through Quetta and Kash (Khash). But neither of these places is named by him, and the description of his route, when carefully compared with the routes followed by other travellers, indicates that he cannot have passed through either place. Secotan cannot have been Quetta, as this site, according to Steel, was less than 28 miles from Duki. It seems likely that both he and Steel went up the Harnai gorge to Pishin (M.'s Pesingan, S.'s Pesinga, and Masson's

Peshing). Chatza (doubtless the Chachcha of the modern Survey sheets) lay inside the mountains, and so cannot have been anywhere near Kala, which is in the plain country, by the Indus. Cushecunna could not be Khash, which is quite out of the way of the old route, the stages of which are given by several travellers. Indeed, Manrique's Calabiche may possibly be a clerical mistake for Griche (i.e. Girishk). A reference to Moll's and Delisle's maps and, for the journey across Persia to Damascus, to Rennell's large Map of Western Asia, drawn in 1809, would have assisted the editors in tracing Manrique's probable route. To give only one example, "Tossarkhan" is obviously Rennell's "Toos Sarkan," marked about 10 miles south of Kangavar. The "great and famous river Sabaa" is, again, clearly the Helmand, and not the Arghandab (p. 340, n. 1). Joseph Salbancke mentions that he crossed this Sabaa at "Grees" (Girishk). C. E. A. W. O.

THE FAR EAST: A political and diplomatic history. By PAYSON J. TREAT. *New York, London: Harper & Brothers* 1928. 9×6 *inches;* xii+550 *pages, and maps.* 16*s*

Professor Treat covers a large amount of ground, and his work will be useful to those who have not time for a fuller study of the subjects dealt with. It is doubtful, however, whether it is wise to try and review the history and civilization of China and Japan (with Indo-China and the Philippines thrown in) in the course of a single volume.

A good third of the work is devoted to Japan, and here indeed the author exercises his surest touch. He hardly, however, carries his story beyond 1922, and even so omits to explain the highly interesting development of Japanese political parties. Moreover, he completely fails to give us the real clue to present-day Japanese politics. He makes the common mistake of speaking of Japan as though she were a single entity, imbued with but one mind and purpose. Japanese opinion is of course divided as in other countries. The big question for her is, What, in relation to her own population problem, is to be her attitude to China? Towards this inscrutable riddle there are, broadly speaking, two main divisions of opinion. The one, represented now by the Government Party, the Seiyukai, is imperialistically inclined, and seeks the solution in a conquest and colonization in Manchuria and Mongolia. The other, the Minseito opposition (formerly the Kenseikai), believes in the peaceful "industrial" solution, involving the maintenance of friendship with China as a potential and indeed essential market. These things alone explain the shifting tendencies of Japanese politics in the latter years, and a book which (on the cover) professes to tell us "what we want to know about the East" should not have been silent on so fundamental a point.

In dealing with China Professor Treat relies too much on early authorities. With no desire to depreciate the great work of these pioneers, it must be said that it is time for a re-interpretation of them which will set the old catch-phrases about China's Conservatism, " peaceful" history, xenophobia, and so forth, in a truer light. Suppose an intelligent Chinaman, who had never heard of the "West," were to come to England. He might go back saying that the people seemed to draw most of their religious inspiration from a Book written from 1800 to 2500 years ago; that their schools and universities employed—for teaching literature, ethics, and politics—foreign "classics," written in an obsolete language at about the same period; that their system of government dated back for centuries; that their farmers employed ancient methods of cultivation; that the people disliked foreigners and held their own country to be the best in the world . . .; and he would conclude (and no doubt justly) that the English are a very conservative people.

As usual, there is very little appreciation of Taoism, though an understanding of it is just as necessary for an appreciation of Chinese character and civilization as is Confucianism—here briefly touched upon, and wrongly called a religion, though the author corrects this error in another passage. In comparing the famous twenty-one Demands of Japan in 1915 (when the imperialist elements had the upper hand) with corresponding earlier "requests" of the Western Powers, greater justice would have been done to the latter if China's attitude to them had been emphasized more; but here again the author hardly gets down to fundamentals.

On p. 375 the date "Aug. 10th" should be "Feb. 10th," and on p. 333 Hankow is misprinted Tankow. The name of the authority quoted on p. 151 should be Backhouse, not "Blackhouse." A. S. E.-S.

A HISTORY OF ETHIOPIA, NUBIA AND ABYSSINIA according to the Hieroglyphic Inscriptions of Egypt and Nubia, and the Ethiopian Chronicles. By Sir E. A. WALLIS BUDGE. 2 volumes. *London: Methuen* 1928. 10×6 *inches;* xxx+675 *pages; sketch-map and illustrations. Three and a half guineas*

Sir Ernest Budge has made many important contributions to our knowledge of the region anciently known as Ethiopia, its languages and literature, and it is not surprising that the late Ras Makonnen, when visiting England in 1905, suggested that he should write a history of Ethiopia and offered to pay for its printing. The present imposing work is the outcome of that suggestion.

The task was certainly a formidable one, involving no doubt the cooperation of various helpers, and this may perhaps explain the want of unity and systematic arrangement which at once strikes the reader as an unfortunate defect in the work. At the outset, too, we can but regret the illogical way in which the terms Ethiopia and Abyssinia are applied. The author states that he has made no attempt to describe the history of Ethiopia, but only of two detached sections of it—Nubia and Abyssinia—which are the two main sections into which the work is divided, though the Nubia portion is summarized somewhat shortly. Almost throughout he discards the terms Ethiopia and Ethiopians, using instead Abyssinia and Abyssinians, though he is well aware that the people resent the use of these words, and though the kings have for centuries called themselves "Negus Nagast za Iteyopeya" (King of the kings of Ethiopia). He even writes of "Abyssinian, *i.e.* Ethiopic, writing and literature," though these have been known for centuries as Ethiopic (or Ge'ez).

The history is sandwiched in between much information of an encyclopaedic character, beginning, curiously, with such present-day matters as "Railways and trade"—there is only part of one railway in Abyssinia—and ending with the oldest monuments in the country, "the monoliths of Aksum." There is no strict regard to chronological sequence. After tracing the history down to the Zagwe dynasty and 1268 A.D. (p. 219), we are shunted back to legendary history (p. 220) for 50 odd pages and then brought to the Zagwe kings again (p. 277) and told that "Abyssinian history only begins in 1268 or 1270." Yet Aksum was founded a thousand and odd years before that, and we have long lists of kings, many of whom are authentic and their names confirmed by the finding of coins. The raids made by the Egyptians under the 12th and 18th dynasties into "the countries to the west of Lake Sana and the Blue Nile," we are told (p. 551), brought the Egyptians into contact with the Western Abyssinians, and "the western coast of the Red Sea belonged to Abyssinia in Pharaonic times" (p. 230). Does this imply that the country was already called "Abyssinia" from the Arab immigrants, but that there was no Aksum? (We are told nothing of the more ancient capital, Ava, discovered by Theodore Bent.) If there is any truth

in the story of "Menyelek," it carries the Arab colonization of Abyssinia back to the time of Solomon (10th century B.C.). Yet we are told more than once that "the facts of history show" that Aksum "was not founded until the first century of our era," and "that the Abyssinians know nothing about the true history of their country in pre-Christian times" (Preface, p. x, and p. 236). In another passage (pp. 234–5) the author admits that Aksum and Adulis existed in the time of the Ptolemies, whose elephant hunters opened up the country.

The author gives short summaries from classical writers, taken at random—Herodotus, Strabo, Pliny, but not the Periplus or Ptolemy. More valuable would have been a general survey of their knowledge of the interior of Africa, and an identification of the places and peoples known to them. The information of these classical writers extended farther than is often supposed, being no doubt derived from traders along the east coast of Africa, Arabs and Phoenicians. If they traded with Sofala and Zimbabwe in the tenth century B.C., they must also have traded with Ethiopia.

Later travellers are similarly neglected; beyond the barest summaries of the journeys of a few of them (pp. 489 *sq.*) there is no discussion of their discoveries —nothing about Pedro Paez and James Bruce and their visits to the source of the Blue Nile, or the discoveries of the brothers d'Abbadie and other travellers. In the bibliographical list (p. 631) we find attributed to "A. T. de Abbadie" (*sic*) the work of his brother Arnauld, "Douze Ans dans la Haute Ethiopie." Names of places are spelled differently on different pages according to Abyssinian, English, or other modes—*e.g.* Keren and (Italian) Cheren (p. 562)—without cross-references in the index. The position of the places mentioned is rarely identified, and the poor sketch-map does not show a tithe of them.

Ethnologically, too, the work is unsatisfactory. The Abyssinians claim to be descended from Ham (p. 129), yet they prefer to be regarded as "the sons of Shem" (p. 190). Early immigration from Arabia, and the conquests of the Arabs from the seventh century onwards in Nubia are only casually referred to (p. 284). The classification of the languages of Abyssinia (pp. 578–9) is an unscientific jumble of names. Some errors of date in the history may be due to the fact, which the author recognizes (p. 138), that the Ethiopic year begins on September 10, and therefore covers parts of two of our Gregorian years. Yet he generally ignores this (pp. 344, etc.). In some cases he gives two alternative dates, even where there is no uncertainty, as with Lobo's arrival in 1625 (p. 390). In following the staccato style of the annals and narrating what might seem to be trivial incidents, he misses their significance in connection with the long-continued struggle against the intruding Gallas, which has so torn the country during the last four centuries.

The printing, as might be expected from the Cambridge University Press, has been well done, though a few errors may be due to the printer, like "Amba Tasus, prince of Shoa" (p. 185) for Bruce's Amha Yasous, "Adna" for Adowa (illustration facing p. 214), "degree" for decree (p. 536), etc.; and Conti Rossini's name should not have been allowed to appear under Conti in the index and bibliography.

It cannot be thought that the work will add to the reputation of the distinguished Orientalist whose name it bears; but, in spite of its defects, it is packed with varied information which will be of service to Oriental students.

F. A. E.

THE EGYPT OF THE SOJOURNER. By GLADYS PETO. (The Outward Bound Library.) *London and Toronto: J. M. Dent & Sons, Ltd.* 1928. 7×4 *inches;* xiv+238 *pages; illustrations and sketch-maps.* 5*s*

This little volume contains a great deal of really excellent gossip. It should prove most useful to a new resident in Egypt and save such a one from many a pitfall. There is much about the country which will not be found in any of the regular guides, which indeed this book is not intended to replace. For those going to Egypt in any official capacity—especially those who are of the sex of the author—the book cannot be too strongly recommended. The attractiveness of the pages is greatly added to by the charming illustrations. E. W. G. M.

SOUTH AFRICA CALLING. By ALYS LOWTH. *London: Cecil Palmer* 1928. 9×6 *inches;* xxiv+310 *pages; and illustrations.* 7*s* 6*d*

This is an account of a tour without tears in South Africa. The author was one of a party which went to the Cape on a business trip, and she has two aims in giving her experiences—the first to tell intending visitors the exact conditions of travel and the principal sights; the second is that which the Prince of Wales has since laid stress upon: the need of British folk to study their market on the spot. Readers of this lively record will find that in large measure the author achieves her aims. The party she was with, like other tourists, did not leave the beaten track, but they journeyed as far as the Victoria Falls and saw something of each of the provinces of the Union. And we get the reaction of a quick-witted woman to novel experiences, so that the old-stager reading these pages is made aware now and then of a new point of view on places and problems to him familiar. There are slips in the book, not perhaps of great moment, but why Miss (or Mrs.) Lowth should persistently spell peninsula with a final *r* we cannot imagine, nor why she describes the Governor-General as the *Duke* of Athlone. The illustrations, from photographs, are good. F. R. C.

IN THE LINCOLN COUNTRY. By REXFORD NEWCOMB. *London: J. B. Lippincott Company* 1928. 9×6 *inches;* 191 *pages; illustrations and sketch-maps.* 15*s*

There can be few historical personages to whom more statues and memorials have been erected than to Abraham Lincoln. Apart from its use to visitors to the many "Lincoln shrines," this book entertains in describing the length to which this hero-worship can go: witness the "splendid temple" built at a cost of a quarter of a million dollars to house the cabin in which he was born, and, less commendable, the transference of the remains of a lady acquainted with Lincoln to a new cemetery for an advertisement. It would not be fair, however, to omit to say that the author deprecates such an attitude. There is sometimes a tendency to lose Lincoln the man among all these associations and monuments; yet in these pages the reader does gain an insight into the reason why these seven generations of Lincolns, moving westwards with the frontier, have come to personify almost the history of their nation.

ON WANDERING WHEELS. By JAN and CORA GORDON. *London: John Lane* 1929. 9×6 *inches;* xii+336 *pages; and illustrations.* 12*s* 6*d*

The wandering wheels were those of an old and somewhat decrepit motor car in which the authors made a leisurely journey throughout a recent summer from Maine to Georgia. They passed through many kinds of scenery and saw a great deal of the rural life of the United States and a little of its urban populations. Their car was their caravan, and where they chose they camped on this pleasant journey. The authors have much gossip to retail and many trivial incidents to

recall, but the result is to give a vivid and intimate picture of how rural America lives both in the north and south. And it is a relief to find no attempt to criticize or solve the social and political problems of the Americans. A book on America without the usual lecture platform utterances on manners, morals and politics of the country is welcome, and this volume is all the more welcome because of the happy spirit in which it is written. There are many charming woodcuts by the author. R. N. R. B.

THE CENTRAL AMERICANS. By ARTHUR RUHL. *New York: Charles Scribner's Sons* 1928. 9×6 *inches;* 284 *pages; illustrations and sketch-maps.* 12*s* 6*d*

The practised pen of Mr. Ruhl has no difficulty in seizing upon salient points of the pleasant lands of Central America. He takes up his tale on shipboard, touches modern Americanized Havana *en route*, calls at Colon, and proceeds thence to Costa Rica. Here he was agreeably impressed, it appears, with San José, but commits himself as a careless observer when he says that there is "nothing to see" in the city, "neither museums nor antiquities nor architecture." As a matter of fact San José de Costa Rica has an excellent and beautifully kept archaeological museum, where treasures of carved stone, exquisite pottery and ancient ornaments delight visitors; the collection of gold ornaments of the region is alone worth a visit to this upland city.

Mr. Ruhl proceeded to one or two towns of Nicaragua, an excuse for treating his readers to an account of the benefits of American control, and next entered Honduras from the Pacific side, visiting Tegucigalpa; from there he went to Salvador; and thence to Guatemala. The pages given to this republic are the most spontaneous in the book, but as in other regions the author did not stray from a very limited part of a thoroughly beaten track, and cannot resist the common American habit of moralizing. Too great a proportion of the Spanish words used are misspelt, and the photographs used as illustrations are in many cases hackneyed. Some have been known to the reviewer for twenty years.

L. E. J.

THE CITIES OF AUSTRALIA. By KATHLEEN USSHER. The Outward Bound Library. *London: J. M. Dent* 1928. 7×4 *inches;* xviii+204 *pages; illustrations and sketch-map.* 5*s*

Though Australia must rank as a new country, its life is focussed to an amazing extent in its towns. Thus a book like this which treats of Australian cities with special emphasis upon the expressions of social activities in those centres, may claim to give an epitome of much of the outward and inner life of the Commonwealth.

Unfortunately the book is written in a very light journalistic vein, is lacking in bold strokes, and is unduly occupied with needless detail. It also displays a too obtrusive satisfaction with the new cities and all their works. The reader who can overlook these defects will find in it a good deal of information of more than mere local interest. The first eight chapters are devoted to the cities themselves—their growth, their architectural features, and their present appearance. They are illustrated with drawings by d'Auvergne Boxall, in most of which reality is sacrificed to artistic effect. The remaining twelve chapters deal with various general topics such as music, art, journalism, and communications. These give us an insight into modern Australian city life, already different under the sunnier southern skies from that of a typical English city. E. W. S.

THE PROSPERITY OF AUSTRALIA: an economic analysis. By F. C. BENHAM. *London: P. S. King & Son* 1928. 9×6 *inches;* x+276 *pages.* 12*s* 6*d*

This book, written by a lecturer in Economics at the University of Sydney, is in complete keeping with its sub-title. The subject-matter is almost exclusively economic and statistical. Since the writer is interested first and foremost in the economic life of Australia, other aspects of the country proper receive very small attention.

The first four chapters contain a closely reasoned analysis of the conditions that contribute to the material welfare of modern countries, with special references throughout to Australia. Mr. Benham has successfully faced the difficult task of collecting statistical data, not always easily accessible or complete, and of arranging his mass of material in proper perspective. Some of his conclusions are interesting. Thus it appears that Australia's progress since the War has been unduly slow; that judged by "income" alone, Australia is rather less prosperous (if anything) than the "older" country; that the amount of actual saving in Australia is considerably less than that of possible and desirable saving.

In his chapters on Protection and Wage-Regulation Mr. Benham enters upon more contentious ground. A convinced Free-Trader, he sets out to prove to the strongly protectionist Australians the errors of their ways, sounding a strong warning against the danger of increased unemployment arising through fixing wages at a higher level than all industries can afford to pay or than all workers can earn. It is somewhat novel for a "new" country such as Australia to have a prophet who asserts that protection is bad for it, who claims that the main effect of high tariffs has been to divert resources and labour from agriculture favoured with a rich natural endowment, to manufactures where the net return without the disguised subsidy is smaller.

Whether Mr. Benham has or has not made good every position he has taken, whether he succeeds or fails in convincing Australian public opinion of what he has to say, he has at all events written a very stimulating book, full of trenchant deductions, if rather categorical in its tone. It is distinctly a contribution to Australian economic literature. E. W. S.

CONTRIBUTIONS TO THE GLACIOLOGY OF NORTH GREENLAND. By LAUGE KOCH. (*Meddelelser om Gronland,* 65, 1928, 184–464.)

Though included as one of the publications of the Second Thule Expedition 1916–1918, Dr. Koch's memoir also contains the equally extensive ice-observations which he made on the Jubilee Expedition 1920–1923; in addition there are some notes on glaciers seen in East Greenland in 1926–1927. This publication embodies therefore the complete ice observations of the most widely travelled of Greenland geologists. The only work at all comparable is Priestley and Wright's Glaciology Memoir, which included work on both the Shackleton and the Scott Antarctic Expeditions of 1907–9 and 1910–12. Dr. Koch acknowledges his indebtedness to Priestley's work, and, barring certain not unimportant criticisms, adopts the latter's classification. This substantial agreement from North and South makes it probable therefore that Priestley's classification is now likely to be widely adopted. Dr. Koch suggests certain modifications, and on the evidence it appears that these changes would definitely improve the classification, making it more elastic and more widely applicable.

More than half of the memoir is devoted to descriptions of the individual glaciers between Melville Bay and Peary Land over a distance of nearly 10° of latitude. The remainder deals with the physical conditions and their bearing on glacier development; with such questions as sea-ice and ice-foot; and finally with the nature of the inland ice. Dr. Koch has gone carefully into the heights

of the gneiss-rock foundation along the east and the west coasts: he finds that both east and west the gneiss surface from a height of 2000 metres in the extreme south (60° N. lat.) slowly dips to sea-level slightly to the south of 70° N. lat.; then suddenly the gneiss surface rises again to 2000 metres, and again sinks slowly to sea-level in 79° N. lat. The dip to sea-level between 68° and 70° N. lat. is then compared with the available knowledge of differences of height on the inland ice itself. These are not too numerous, but Dr. Koch regards them as sufficient to indicate a depression across Greenland along these same latitudes. He can therefore claim that the inland ice (or, to use Priestley and Koch's term, the continental ice) of Greenland is definitely dependent, at least in its biggest aspects, on the underlying solid rock foundation. A stepped section shows this interesting feature, and is accompanied by a carefully contoured map of the ice-cap as at present known.

In recent years so little new work on glaciology has appeared written in English, that Dr. Koch's memoir is extremely welcome; and especially valuable in the first attempt at correlation between Arctic and Antarctic. J. M. W.

AGRICULTURAL GEOLOGY. By F. V. EMERSON. Second edition revised by J. E. SMITH. *New York: John Wiley & Sons; London: Chapman & Hall* 1928. 9×6 *inches;* xvi+377 *pages;* 271 *figs.* 16*s*

This text-book is intended primarily for classroom use by agricultural students, and the changes made in the second edition are entirely of a minor character. The volume has the advantage of including within its compass a complete course of geology for such students, together with an extensive treatment of the geology of soils. Therein lies the main weakness of the book: the science of soil-study has progressed so much in recent years that the geological basis is no longer adequate for a detailed treatment. There is now little doubt that climate plays as large a part in the formation of soil as does the character of the underlying rocks. Yet the influence of climate is virtually dismissed in a single page (pp. 103–4); "laterite" does not even appear in the index and is accorded merely a couple of sentences on p. 94. Although a very large part of the book is devoted to a description of soils, such well-known types as podsols and regur do not appear to be mentioned. What may have been adequate a decade or more ago is to-day insufficient; the volume oversteps the basis of pure geology without giving a satisfactory treatment of the science thus included. At the same time the geological basis is, in places, sketchy and disjointed. One may ask whether any useful account of the whole of historical geology can be given in a dozen pages, including illustrations, or of rock-forming minerals in eleven. A number of brief statements call for correction or explanation—does folding generate heat? (p. 52); does anthracite result from the gentle folding of bituminous coal-seams? (p. 53 and fig. 39); are fiords due simply to a combination of coastal depression and glacial erosion? (p. 250); are eskers "evidently" the beds of sub-glacial streams? (p. 246).

Mention must be made of the numerous excellent little line illustrations, but the half-tone illustrations are frequently too small to be of real use (see figs. 64, 65, 72, 90, 91, 94, 129, 135, etc.). Surely fig. 48b is upside down? In short, this book might be made the best text-book on the subject, but requires a very thorough revision both by a geologist and a pedologist. L. D. S.

SOME NOTABLE SURVEYORS AND MAP-MAKERS OF THE SIXTEENTH, SEVENTEENTH AND EIGHTEENTH CENTURIES AND THEIR WORK. By Sir HERBERT GEORGE FORDHAM. *Cambridge: University Press* 1929. 8×5 *inches;* 100 *pages; and illustrations.* 6*s*

This slender but well-produced volume was issued from the Press only a short while before the deeply regretted death of the author. Carto-bibliography was Sir George Fordham's chosen field of research, but even within this field he was eclectic, devoting himself particularly to the road-maps of his own country and of France. Behind the maps, however, are always the map-makers, and Sir George had put together from time to time biographical notes upon such interesting personalities as the Yorkshireman Christopher Saxton, the Jaillots, John Ogilby, John Cary, and others. These he has woven into a continuous narrative of the development and progress of cartography, in England and France, beginning with Saxton's county maps, and ending with General William Roy and the early days of the Ordnance Survey. Several facsimile maps, and a handsome portrait of the elder Jaillot, are included among the carefully chosen illustrations. English works on the history of geographical science are few, and this brief but scholarly survey of cartography, furnished with a carefully compiled bibliography, will prove useful to students. The charm alike of the subject and of its treatment must make their appeal, besides, to all who love maps As Sir George Fordham himself says, in the Conclusion to his work: "[Cartography] is alive with beauties—beauties of art which appeal to the eye and to taste—beauties of science and of human endeavour with which the whole structure is adorned and illustrated, and it is from this point of view that this book has been written and is now offered to the public." E. G. R. T.

THE AMERICAN WHALEMAN. A study of life and labor in the whaling industry. By E. P. HOHMAN. *New York and London: Longmans, Green & Co.* 1928. 9×6 *inches;* xiv+356 *pages; illustrations.* 25*s*

The whaler receives its full share of the revival of interest in the ships and sailors of the age of wind power. There have been several volumes in recent years that dealt mainly with the whaling ships and their adventures. Mr. Hohman has made a study of the men and the economic conditions of the industry. His material was not gathered by personal experience but in numbers of manuscript logs, account books, crew-lists and other unpublished material which is available mainly in four places: the Public Library, New Bedford; Old Dartmouth Historical Society, New Bedford; the Nantucket Whaling Museum; and the Widener Library of Harvard University. The greater part of the book describes the life of the whalemen ashore and afloat, the risks they ran, the profits they sometimes made, and the balance-sheets of the whaling companies. The rise and decay of the industry are also traced. The period of great prosperity lasted only from 1830 to about 1860. After that the decline was rapid: the loss of vessels during the civil war, the many wrecks when the whalers invaded Arctic seas, the scarcity of whales, the competition of mineral oil and the growth of manufacturing which made a rival call for capital and men, were all contributary factors. In 1846 there were 722 American whalers belonging to New England ports, principally New Bedford, New London and Nantucket. In 1924 the last whaler on the active list was wrecked. The book has a few illustrations from old prints and a careful bibliography. It is a real contribution to the history of whaling, and the abundant footnotes indicate the way for further researches in the subject. R. N. R. B.

THE MONTHLY RECORD

THE ACHENSEE IN NORTHERN TIROL

The Achensee is the largest and deepest of the lakes of Northern Tirol, having a length of about 9 km., though for the most part less than 1 km. in breadth. Its mean depth has been reckoned at 71 m., or 233 feet, while the maximum is 133 m., or 436 feet. Its altitude is 929 m., or 400 m. higher than that of the Inn valley, only 5 km. distant in a straight line, with which however it has no natural connection, its outlet being towards the north, to the Isar. These conditions suggested it as specially fitted to serve as a reservoir for water-power production, and work to this end was begun in 1924 by the construction of a dam at the north end and an artificial outlet towards the Inn valley, with a final fall of 380 m. at the power-station above Jenbach. The general form of the basin had previously been known through the work of Geistbeck and Machatchek, but it was felt that a more precise survey of the shallower southern part of the lake was desirable, as this would be specially affected by changes of the surface-level. This was undertaken by Herr Walter Hacker, who has described his operations, with a contoured map of their results, in the *Mitteilungen* of the Vienna Geographical Society, Bd. 71, 1928, Nr. 4–6. The methods adopted were noteworthy for the minute attention given to accuracy of detail, contrasting in this respect with the somewhat rough and ready methods of the earlier lake-surveys, and made possible only by the use of various instruments of precision and the cooperation of several assistants. The sounding itself was effected from a craft formed of two flat-bottomed boats joined by planks—this for the purpose of stability. The starting-points of the cross-sections were accurately fixed by a careful survey of the shores depending on a measured base. The exact position of each sounding was fixed by bearings with two theodolites, stationed at suitable points on the shore, and chances of error were further eliminated by carrying on the work for the most part only in calm weather. The daily fluctuations of level were also carefully recorded. In the part of the lake surveyed twenty-eight complete cross-sections with 1864 separate soundings were obtained, the average distance apart of the sections being only 40 m. At certain parts of the shores still more precise work was carried out by means of a marked rope stretched from the water-line to a moored boat. The resulting map was on the scale of 1/1000, from which a photographic reduction to 1/6000 was made to accompany the paper. The results of temperature determinations are also recorded. The precision with which the survey has been made will make it possible to trace future modifications in the lake's contours.

THE DRY REGIONS OF EUROPE

In a paper entitled "Die Trockengebiete Europes und deren Ursachen," published in the *Zeitschrift der Gesellschaft für Endkunde zu Berlin* (1928, nr. 2/10), Dr. G. Hellmann reviews the dry regions of the various countries of Europe according to the criterion of a mean annual rainfall below 500 mm.—a value slightly in excess of 20 inches, which would be the corresponding criterion in English measures.

Russia, with more than half its area dry, and Spain, with quite a half, are easily the most drought-stricken countries in Europe; but many others, including Greece, Germany, Denmark, Norway, Poland, France, and Romania, Czechoslovakia and Austria have larger or smaller areas fulfilling the definition. The rainy British Isles have no dry region but escape only by a narrow margin, for there are a few spots on the east coast of England, viz. Shoeburyness, Clacton, and Spurn Head, where the rainfall is slightly below 20 inches.

The most potent factor in the causation of these dry regions is position in the

rain-shadow of high ground, as is the case very conspicuously on the east coast of Spain; but flat coasts and islands, as in the Danish archipelago and the Baltic coast of Germany, where there is not much tendency for the air current to rise, are also apt to be rather dry, and so also are cold regions like the extreme north of Europe, where the vapour pressure is small. An interesting dry area occurs in the interior of Norway in the lee of the very rainy west coast. On the south-east coast of Spain there are stretches with only 200 mm., and here and there even 100 mm. (8 to 4 inches), and this is the driest part of Europe, with vegetation having an African stamp. Incidentally the rainiest spot in Europe is stated to be on the plateau of Crkvice, Yugoslavia; but it is doubtful where this is wetter than certain spots in the British Isles.

The study, like others of its kind, has the advantage of precision, but this can only be gained at the price of somewhat narrow and arbitrary definitions. A place, for instance, on the east coast of Spain with 10 inches is out of all proportion drier than one on the east coast of England with 20 inches because of the hot and arid Mediterranean summer.

LAKES BAIKAL AND TANGANYIKA COMPARED

An instructive study entitled "Der Baikal und der Tanganjika, die beiden tiefsten Seen der Erde," by W. Halbfass, appears in the *Geographische Zeitschrift* (34 Jahrgang, 9 Heft, 1928). It includes comparisons of the morphology, geology, hydrology, biology, climatology, and ethnology of the two lakes, together with a table of numerical data relating to size, length, breadth, depth, etc. Baikal is the deepest lake in the world, the maximum depth being 1523 metres as against 1435 metres for Tanganyika—over 4000 feet in either case.

Both lakes are of tectonic origin, are long and narrow, and trend approximately north and south. They both, too, form something of a "divide" as regards climate, fauna, flora, and people, whilst both depressions are very much isolated, with thinly peopled shores. There is, however, a good deal of dissimilarity between the two lakes, apart from the tropical climate of the one, and the sub-polar climate of the other. Thus the drainage basin of Baikal is large, that of Tanganyika relatively so small that the water-content is mainly determined by rainfall and evaporation. Then Baikal is more than 2000 kms. from the nearest coast, Tanganyika barely 1000 kms.; and whereas the shore tribes of Baikal mainly live by fishing, those of the African lake are mainly engaged in agriculture.

It appears that the once general view that each of these lakes is a "survival sea" (Reliktensee) must now be abandoned, though there is good evidence that in the earlier stages of their history they may at times have communicated with the sea. The Baikal fauna is very rich. Some of the forms show affinity with a subtropical Tertiary fauna which, entering the lake in Miocene times, have been perpetuated along with more recent forms. Tanganyika is richer in species than the other African equatorial lakes, with a larger percentage of endemic forms. Both lakes contain marine forms which might be accounted for by their sea-like size and depth. As regards climate, the east coast of Tanganyika is much more equable in temperature than the west, and the rainfall is about a half less. In the dry season there are regular land and lake breezes, but in the wet the less regular winds are stormy and dangerous to boats. No lake in the world appears to exert so much influence on the air temperature of its neighbourhood as lake Baikal. There is naturally a cooling influence in summer, and a warming influence in winter, though only during the early winter before the surface of the lake is frozen hard and snow covered. The cooling effect in June amounts to 5·3° C., with a similar warming effect in December. We thus have the

phenomenon of a sea-climate exhibited in the heart of a continent. It is pointed out that whereas on the mean of twelve observation-stations August is 0·5° C. warmer than July on the shores of Baikal, not even in the most oceanic parts of the British Isles is August more than 0·3° C. warmer than July. This may be explained by the lateness of Lake Baikal in freezing and melting, and the resulting unduly cold water of June and July in comparison with August. Hence it seems hardly correct to say that the climatic influence of Baikal on its neighbourhood is proportionately greater than that of the Atlantic Ocean on Western Europe. In neither case have natural conditions favoured a high cultural development of the inhabitants, and the shores of both lakes are difficult of access. Tanganyika suffers much from storms, which hinder communication with the opposite shores, but this is facilitated in the case of Baikal during the period when it is frozen over.

CURRENTS IN BAB EL MANDEB

The results of recent oceanographical research in the Red Sea and the Gulf of Aden, including the work of the Italian survey ship *Ammiraglio Magnaghi* in 1923–24, are summarized by Dr. G. Schott in *Annalen der Hydrographie* (15 January 1929). They establish the existence, along with the surface current which flows for the greater part of the year through the Bab el Mandeb to replace the loss by evaporation in the Red Sea, of a second deep-sea current flowing in the contrary direction, into the Gulf of Aden. The conditions are very similar to those in the Straits of Gibraltar: for there the theory has been advanced and maintained that no water from the Mediterranean escapes permanently to the west—the Mediterranean deep-sea current rises vertically before the Gibraltar "sill," and is carried eastwards again by the incoming surface current. In the Bab el Mandeb straits, however, the "sill" separating the Red Sea and Indian Ocean troughs is about 80 miles inside the Perim narrows. On either side the depths rapidly increase to more than 1000 metres. The salinity of the southern Red Sea increases from 37 or 37·8 parts per thousand on the surface to 40 per thousand at 200 metres: the temperature ranges from 26° on the surface to 24° at 200 metres and 21·5° below 1000 metres. From the results obtained by the Italians, it is obvious that this water, with a salinity above 37, extends at a depth of about 740 metres into the Gulf of Aden 150 miles beyond Perim or even farther to the east. Above this layer, at about 200 metres, is a current, entering the Red Sea, which off Aden has a salinity as low as 35·7 and 35·5. Temperature readings also bear out the existence of this Red Sea deep current: there is the striking temperature gradient on the outer face of the "sill," which begins at 27° on the surface, declines to 14·8° at 200 metres, and then between 750 and 1000 metres climbs from 4·5° to 19·3°. In the "neutral" or surface layer, down to about 100 metres, oscillations of temperature and salinity are related to the rhythm of the tides: when the flood from the Indian Ocean passes the straits, the salinity increases; with the ebb it decreases. The flood is characteristic deep-sea water, with a lower temperature. The precise conditions in the surface layers are affected by the weather, depending upon the winter and summer monsoons. The east and south-east winds of the wet monsoon favour the conditions described above. The existence of a compensatory flow of currents has therefore been confirmed for the Straits of Bab el Mandeb by recent research.

COMMUNICATIONS IN MOROCCO

In a detailed contribution to *Hespéris* (1927, pp. 447–97: "L'Atlas et la circulation au Maroc") Monsieur J. Célérier treats the general conditions, physical, economic and political, which govern communications in Morocco, the progress

at present achieved in trans-Atlas routes, and the objectives of a considered plan of construction. Traffic in North Africa has always been meridional, partly from structural and partly from climatic reasons. The oases dwellers have been kept in contact with the corn-growing peoples of the littoral by the nomads of the intervening steppe regions. In Morocco this orientation has been altered by the greater climatic influence of the Atlantic and the attraction of the ports of the Atlantic seaboard. Thus lines of traffic have run south-east to north-west, that is diagonal to the structural lines of the Atlas. Despite the difficulties thus produced, traffic has always been maintained; but the advent of European influence has altered the balance of forces somewhat. Until the recent development of West Africa, the southern desert was not the limit to trade it now is. M. Célérier believes, however, that with the advance in trans-Saharan communications in prospect, former conditions will be in some degree restored. With further political settlements with the mountain tribesmen, another main obstacle to trade will be removed. The writer is aware that in this trans-Atlas traffic there is little interest for European commerce, but he considers that it should be encouraged, lest Morocco break up into two definite sections, Europeanized Morocco and indigenous Morocco. At present, much has been done by the military; but the moment when large areas are coming under civil administration is opportune for an examination of the whole question.

The trans-Atlas, and indeed most of Moroccan, communications are controlled by the two centres, at some distance from the sea on the high rich "Dir," Fez–Meknes and Marrakesh: with the exception of the seaports, particularly Casablanca, they dominate the system of communication. The only easy transverse routes at present are at either end of the system, the Taza corridor in the north-east, and the coast route by Mogador in the south-west. The coastal road has been carried from Mogador to Agadir, with a route fit for motor cycles beyond Tirnit to the foothills of the Anti-Atlas. Another motor cycle route has been carried from Marrakesh southwards via the Tiri n'Machu pass to join the Agadir–Tarudant route. But, more important for the communications with the Sus, a modern motor road has already been carried from Marrakesh as far as Asni, and will ultimately cross by the difficult Gundafa pass, placing Tarudant in easy communication with Marrakesh. To the east, routes are more difficult owing to the change in the structure: the Jurassic type of highland with interior parallel valleys makes transverse communication difficult. A route which has lost its former importance is that eastwards from Marrakesh via Zerekten–Teluet to the upper Wad Dra'a, and ultimately to the Sudan: this was widely known during the middle ages as the "gate of Deren." With the separation of the Middle and Great Atlas, the difficulties are increased: routes south-east from Fez crossing two mountains and, transversely, the Muluya plain. There are two routes across the first range—via Tarzeft, that favoured by political conditions, and, farther north, via the Recifa gorge. The latter, the easier to negotiate, was on the great historic mediaeval route from Fez, which then negotiated the Ayachi massif by Telrhemt, passed on to Tafilelt and finally to Timbuktu. This route was for long organized by Jewish merchants, but the cessation of the slave trade and the competition of ocean-borne commerce have destroyed its importance. On this route it is now possible to travel from Meknes to Bu Dnib, that is, right across the two ranges; and a modern road has been built as far as Tarzeft. A branch from the latter route runs south to Khenifra.

The system which M. Célérier proposes is that of a longitudinal road on either side of the Atlas, joined at intervals by transverse sections. The Fez–Marrakesh road at present in course of construction is the foundation for the northern longitudinal route: the southern, joining the Sus with the Tafilelt, via

Tarudant and Teluet, would present little difficulty. A third longitudinal route following the wide Muluya valley could also be inserted. At least six transverse routes, already mentioned above, could be opened within a very short time. One of the most important of these is that which, setting out from Casablanca, would traverse the Middle Atlas at Tadla to the Tafilelt. This would cross the inner longitudinal route at the head of the Muluya valley. giving this point extreme importance for the Atlas communications.

AN ITALIAN TRAVELLER IN EGYPT, 1823–26

The encouragement given by Mehemet Ali in the early years of the last century to the scientific investigation of the resources, especially the mineral resources, of Egypt has frequently been noted. The work done by one of the scientists thus employed, however, has escaped general notice, although exceedingly valuable. Giambattista Brocchi was recognized as one of the pre-eminent geologists and palaeontologists of his day, so that it at first appears strange that his record of work during three years in Egypt should have escaped notice. In discussing this question in the *Bulletin* of the Royal Geographical Society of Egypt (vol. 16, 1928, pp. 189–223) Sig. Angelo Sammarco states that Brocchi's 'Giornale delle osservazioni fatte nei viaggi in Egitto, nella Siria e nella Nubia' was not published until twenty years after his death; that it was really the rough material for a comprehensive work on Egypt; and that readers, aware of Brocchi's eminence as a geologist, and finding that his 'Giornale' dealt with many diverse subjects, assumed too readily that it was diffuse and superficial, and perhaps largely a compilation. This was far from being the case, for Sig. Sammarco demonstrates its value for students of Egyptian history and science. Brocchi began his first journey from Cairo in January 1823, and, until his death at Khartoum in September 1826, was continually recording his observations and collecting information from all available sources. During his sojourns in Cairo between his journeys, he devoted his attention to the social, political, and economic side of Egyptian life. The records of his journeys show that he recognized, and traced over large areas, the fundamental features of the geology of the country: the Nile valley is described carefully; and he also compiled valuable records of the flora of Nubia. His first journey (January–June 1923) was up the Nile to Qena, and on, after a short diversion into the eastern desert, to Redesiya. Thence he turned eastwards towards the emerald-mines of Sikket and Zabara, and the Red Sea littoral. There he noted evidences of the elevation of the land with respect to the sea-level. The return to Qena was by way of Qoseir. On his second journey he travelled from Qoseir through the mountains, of the eastern desert to Suez, examining mineral deposits *en route*. Then followed an expedition to Syria. He left Cairo for the last time in March 1825 going, at Mehemet's special request, to Sennar. The Egyptian Sudan had just been occupied by the Egyptians, so that Brocchi's records of his stay at Khartoum and at Sennar are of special interest. At Sennar he was prevented by the turbulent state of the country from carrying out his intention of searching for minerals towards the Abyssinian frontier and in Darfur. He died at Khartoum from fever on 17 September 1826.

THE RECESSION OF NIAGARA

Various calculations of the annual rate of recession of Niagara Falls have been made on the basis of successive surveys of their crest-line, from 1842 onwards. Ten such surveys had been made down to 1927, the method being instrumental intersection for the determination of points along the edge of the falls: the instruments used were either surveyor's compass, theodolite, or telescopic alidade. In 1927 a survey by a new method was carried out by Mr. H. H.

Boyd at the request of Dr. Charles Camsell, which has given more trustworthy results than the previous ones. They have been described by Mr. Boyd in the *Transactions* of the Royal Society of Canada for 1928 (vol. 22, part 1, sect. iv). By assembling on one plan the crest-lines of the Horseshoe Fall as determined by surveys previous to 1927, Mr. Boyd brings out certain inconsistencies, since the successive crest-lines overlap in places, and portions of some lie on the down-stream side of others as given by a previous survey. This has arisen from the difficulty (1) of identifying the same point on the crest of the fall from different stations; (2) of correctly pointing the instrument to that point; (3) of deciding the correct relation of that point to the actual rock-crest. These difficulties were overcome in 1927 by the use of the surveying camera, by which directions to all points on the crest are recorded automatically in the picture. Surveying cameras were placed at three well-established stations, and photographs of the same portion of the falls were taken simultaneously from each. Elevations of the rock-crest of the Horseshoe Fall were also obtained for the first time. The American fall was surveyed by the regular methods of photo-topography, the difficulties being here lessened by the thinness of the sheet of water, which permits the rock crest to be more clearly seen. In applying the results of this survey to a calculation of the rate of recession, special care was taken to consider the different directions of recession at different points, such directions being generally perpendicular to the curve of the crest-line. As the recession down to 1905 was mostly under natural conditions, since modified by diversion of water, Mr. Boyd has used the maps for 1842, 1905–6, and 1927 for estimating the respective rates of recession, which at the apex-zone of the Horseshoe Fall work out as 3·8 and 2·3 feet per year for the two periods. On this basis the recession of the fall to the head of the rapids will not take place for 2000 years. There appears to have been no measurable recession of the American fall in the last thirty years.

The same number contains a discussion of the age of the Great Gorge of Niagara river on the basis of recent borings at Michigan Central railway bridge, which show that the whole of the whirlpool Rapids gorge is an old gorge filled with glacial drift. The conclusion is reached that the gorge was formed by an inter-glacial, not a pre-glacial, Niagara.

NAVIGATION OF THE MURRAY RIVER

In an interesting historical account of the attempts of South Australia to control the Murray River system (read at the Western Australian Meeting of the Australian Association for the Advancement of Science, 1926), Mr. A. Grenfell Price shows clearly how political and other considerations have hindered the full utilization of its geographical advantages. It was the discovery of the Murray by Sturt that gave the first impetus to the foundation of the colony. On account, however, of the lack of a navigable channel into Lake Alexandrina, and the exposed nature of the neighbouring coast-line, the eastern shore of Gulf St. Vincent was chosen by Light for the settlement. Adelaide, however, is cut off from the Murray by the Mount Lofty Range, and for a time the advantages of the great river system were neglected. In 1849 Sir H. Young proposed to build a port to the west of the river-mouth at Freeman's Nob, renamed Port Elliott, and to cut a canal or lay a tramway through to the Goolwa channel. Again the argument of the exposed nature of the coast and the opposition of vested interests at Adelaide secured its being shelved. Work was finally begun in 1852 on Port Elliott, and the mouth of the Murray buoyed; the following year saw the initiation of steamer services on the upper river, when a river steamer made the passage from Mannum to Goolwa. Then, just as the

prospect of developing the river system as an economic whole seemed feasible, opposition appeared in the other colonies interested, and a long customs struggle began. This was probably sufficient to defeat the scheme without the final exposure in 1856 of the unsuitability of Port Elliott. For twenty years, South Australia ceased to be interested in the Murray: neighbouring states, particularly Victoria, pushed their railways to the Murray: and, by offering considerable concessions, captured most of the traffic. When South Australia realized the position, the attempts made to meet the competition also consisted largely in railway construction; for example, the extension of the Kapunda Railway to the North-West Bend of the Murray in 1878. Recent irrigation works have affected the level of the river; this difficulty can be overcome, but the obstacles to a full development remain, the comparative slowness of river barges, the danger in towing heavily laden barges across the lakes at the mouth, the vested interests to be conciliated, and, of course, the great expenditure requisite. Until these are overcome, there will still be " the spectacle of the commerce of the Western Riverina being dragged from its natural pathway by the transmountain railways of rival states."

NEW ZEALAND IN EARLY DAYS

The literature on the earliest stages of British settlement in New Zealand is comparatively scanty, so that the publication by Sir Frederick Chapman (Alexander Turnbull Library, Bulletin 3, 1928) of a journal kept during a visit to the North Island in 1820 by Ensign Alexander McCrae, is of distinct value to historical students. Sir Frederick supplies a short introduction setting forth the position of affairs at the date of McCrae's visit. Commissioner Bigge had been sent out by the Admiralty to make inquiries with a view to possible developments in the direction of colonization, and as both he and McCrae returned together to England in the *Dromedary*, the information obtained from the latter was embodied in the Commissioner's report, forming a useful supplement to that supplied by the missionaries then lately established in New Zealand under the Church Missionary Society. McCrae had sailed from England in 1819 in H.M.S. Store Ship *Dromedary*, which took out 360 convicts to New South Wales and Van Diemen's Land, and from Port Jackson proceeded to New Zealand to study the possibility of there obtaining timber for the Navy. Being of an inquiring disposition he made good use of his residence of ten months by carrying out excursions in various directions, mixing freely with the natives, and so gaining a clear insight into their ways, and finding them possessed of many admirable qualities. The country impressed him equally favourably, and he dwells on the advantages it offered for British colonization. The Journal (which also includes a narrative of the voyage from England to Australia, not now printed) came into the hands of the writer's younger sister, Mrs. Thomas, who resided for some time at Pelichet Bay near Dunedin. Her house there was burnt with most of its contents, but a box containing papers (among them the Journal) was saved. The connected narrative ends in 29 March 1820, and it is possible that its continuation was lost in the fire. Another journal, kept by Capt. Cruise, McCrae's superior officer during the stay in New Zealand, was published in 1823, and the substance of it also has been attributed to McCrae, but without any real evidence. The pamphlet concludes with notes on the Maori names, by Mr. J. C. Anderson, Librarian of the Turnbull Library.

HYDROGRAPHY OF THE BOSPORUS AND DARDANELLES

The hydrographical conditions in straits connecting seas differently situated as regards climate are both interesting and complicated, and can only be elucidated by prolonged and detailed observations. Those carried out in the

Bosporus and Dardanelles in 1917–18 by Prof. Alfred Merz, whose untimely death while at the head of the German Oceanographical Expedition in the *Meteor* has been so much deplored, were the most careful that had hitherto been made, their value being enhanced by the use of the new Ekman-Merz current-meter which permits the measurement of both strong and weak movements with equal precision. Prof. Merz was called away to the still more important work in the Atlantic before fully working out the results of his observations, but the completion of the task has fallen into the capable hands of his former pupil, Dr. Lotte Möller, who has carried it out with full knowledge of Prof. Merz's views and intentions. The result is a valuable monograph published as one of the *Veröffentlichungen* of the Berlin Institut für Meereskunde (of which the deceased Professor had been Director), together with an Atlas of sixteen large-scale current-charts. A good part of the actual *data* had been prepared for press in graphic and tabular form by the Professor himself, and these, together with a portion of the explanatory text, are given as he left them; but their completion, and all the final deductions as to the régime of the currents, etc., are the work of Dr. Möller. These are concisely summarized in Section VII of the Monograph. We can here give only brief notes on some of the conclusions reached.

Owing to the differing climatic conditions in the Black Sea and the Aegean there is a fairly constant difference of density between their waters, leading to a down-grade surface movement from the lighter to the heavier, and one in the contrary direction in the depths occasioned by the difference of pressure. Both strata take a wedge-form, the plane of separation rising in the direction of the surface flow. Owing to the narrowness of the channels connecting the two seas the equalizing movements are rapid as compared with those in open waters. Both in the straits and in the seas which they connect there is a marked plane of separation between the layers of less and greater salinity above and below it, and a temperature inversion occurs at the same level. This plane rises from 50 metres at the entrance to the Bosporus to about 15 or 20 opposite Stambul, and to 10 metres in the narrows between Nagara and Chanak. It might be supposed that the plane separating the upper and under currents would coincide with this; it does not, however, but rises more gradually and appears to intersect the other about the narrowest parts of the straits. As a result some of the upper water passes back with the lower in the northern parts of the straits, and vice versa in the southern. The upper current forms a narrow band on the surface (the limits being determined by the projections of the coasts), but spreads out lower down, where its rate is consequently less. The flow is accelerated in the more southern parts of either strait by reason of the wedge-form of the moving water. The under current follows the windings of the channels much more closely than the upper, and its line of greatest speed is therefore seldom vertically below that of the other. Neither current occupies the whole of the channels, but whirlpools are formed in all the bays. The monograph also deals with periodic variations in the circulation, and the effects of wind and pressure changes, besides making suggestions for the further prosecution of the work.

OBITUARY

ADMIRAL OF THE FLEET SIR EDWARD H. SEYMOUR, G.C.B., O.M., G.C.V.O.

In figure, mind, and character, Edward Seymour was of great distinction, not only distinguished but distinctive. A certain detachment of manner may have given an impression of aloofness to those who did not know him well. Those who had to deal with him had opportunities of seeing the expression given to a warm heart and a sympathetic mind.

Constantly employed on active service from the age of fifteen to that of thirty-one, he emerged from such service with a wound and also with a fine reputation of proved courage and capacity. He added to his professional knowledge by being a fine linguist and having many interests outside his own profession, and any subject—History, Art or Literature—would be sure of sympathetic encouragement at his table. His indifference to, indeed ignorance of, personal danger was remarkable. It was with difficulty that he could be got to move at more than a walking pace when under the hottest fire during the advance on Peking in 1900, and it was only the assurance by his staff that if he walked they must go the same pace that induced him with great distaste to give an appearance of haste.

The work he accomplished during those times was immense. Decisions, administrations, interviews with foreign admirals, generals, and diplomats were executed without undue deliberation or undue haste. He found, at times he seemed to make, time. The writer remembers receiving a note from him saying that as he—Sir Edward—had followed the writer's father into the Taku Forts in 1858, it was a matter of regret to him that the writer happened to be in the Yangtse, and therefore unable to follow him on a similar expedition in 1900.

He had been a Fellow of our Society for forty years. He combined in a very rare degree simplicity and unconscious dignity. No better description can be given of him than

"EDWARD HOBART SEYMOUR,
Knight Grand Cross of the Bath."

He never married.

W. E. G.

PROFESSOR E. H. L. SCHWARZ

Ernest Herbert Louis Schwarz was born in London on 27 February 1873, and was educated at Westminster and the Royal College of Science, but the greater part of his life was passed in South Africa. For about a year he was editor of *The Scientific African* at Johannesburg, but in 1896 he joined the staff of the Geological Commission of the Cape of Good Hope, and for nearly ten years he did much useful field-work in that service. He was, however, always attracted towards the speculative side of geology, and his appointment in 1905 as Professor of Geology at the Rhodes University College at Grahamstown gave him greater freedom. He held the chair until his death, and his most characteristic work belongs to this period of his life.

He was remarkably fertile in ideas and, though they were not always fully worked out, his suggestions are usually of value. In 1910 he published his 'Causal Geology,' in which he started with Chamberlin's planetesimal hypothesis but carried his deductions from it much further than Chamberlin ever did. He was one of the first to attach importance to a westward creep of the continental masses (*G.J.*, 40, 294), but it was not a drift in the sense of Wegener that he had in mind. In his later years he was much occupied with a project for reclaiming the Kalahari by the formation of an artificial lake. Apart from

his advocacy of the scheme in South African publications, he brought the subject before the Royal Geographical Society in November 1920 (*G.J.*, 57, 166).

His interests were not confined to the science with which he was more particularly concerned. One of the fruits of his work in the Kalahari was a book on 'The Kalahari and its Native Races,' published in 1928.

The last two or three months of his life were spent on the African coast north of St. Louis, Senegal. His interest in the Kalahari irrigation scheme made him desirous of comparing desert conditions in North Africa with those in the south: yet it is characteristic of his versatility that after his death a letter to the Editor of the *Journal* was found upon his table, in which he advanced a solution of the problem of the five colonies founded by Hanno the Carthaginian along that coast. A similar letter was published in *The Times* for March 21. He made expeditions by camel into the interior, and also examined the coast as far north as Arguin island by motor boat, landing, amongst other places, upon the little-frequented Ikniua islands. His enthusiasm for this work led him to overtax his strength, and on his return to St. Louis he died in his sleep from heart failure on 19 December 1928. P. L.

CORRESPONDENCE

THE MAP OF SPITSBERGEN

In the August number of the *Geographical Journal* is inserted a review of the 'Report of the Svalbard Commissioner concerning the claims to land in Svalbard.' This review contains, however, some misunderstandings which I may be permitted to correct.

When it is said that the atlas "does not claim to embody new survey work" this is not in agreement with the facts, as will appear clearly from the atlas itself. On the back of the title-page in Part II is printed, "Maps Nos. 5, 6, 7, 8 (–22), 9, 10, 11 (–19), 14 (includes 23 and 24), 17, and 21 in Part I, and Nos. 27, 30 (includes 16, 28, and parts of 26), 31 (includes parts of 26), 32, and 33 in Part II have not been published before . . ." The list should also include No. 25.

Of the thirty-four maps contained in the atlas, thus twenty-three are entirely surveyed on the Norwegian Expeditions 1911–25, and have not been published before. No. 12 is taken from the map of the Russian Arc of Meridian Expedition and the source is noted on the map. The remaining ten numbers are partly based on the two following maps: "Spitsberg (Côte Nord-Ouest), Carte dressée sous la Direction de S.A.S. le Prince de Monaco pendant les saisons d'été 1906 et 1907 par la Mission Isachsen," printed 1910, and "Spitsberg (Partie Nord-Ouest), Carte dressée sous la Direction du Capitaine Gunnar Isachsen par l'Expédition Norvégienne 1909–1910," printed 1915. The topographical results of these two expeditions are in the possession of Norges Svalbard-og Ishavs-undersøkelser, and this material has been used in the construction of the mentioned ten maps. On all of them, however, will be found corrections and additions resulting from original surveys carried out on the Norwegian expeditions after 1911. It would thus not have been correct to give the two mentioned maps alone as the source. For sake of convenience I have only noted the year of the expedition and the name of the leader, thinking this to be sufficient.

The reviewer complains about the translation of foreign place-names into Norwegian. Opinions may differ whether place-names should be translated

or not. However, it seems to me that Englishmen have led the way by translating old Dutch names into English. Moreover, place-names in Spitsbergen have nearly always been translated into the language of the map in question. Thus in English Kings Bay, in German Königsbucht, in French Port du Roi, in Russian *Zaliv Karolevsky*, etc. Then it seems to me a little out of place to deprecate that an official Norwegian mapwork uses Norwegian names, *in casu Kongsfjorden*, the more so as the country belongs to Norway and at least 90 per cent. of those who use the maps are Norwegian.

Regarding Mount Temple we have not altered the original Mount Temple to Sindballefjellet. It is Mr. Mathieson who on his map has called Mount Temple of De Geer (1912) for Temple Range and has transferred Mount Temple to a mountain east of Bjonahamna (Bjona Haven). What we have done is merely to put Templet (Mount Temple) back to its original place, only this deserving the name. The mountain called Mount Temple by Mr. Mathieson bears the name Nathorst-Berg on the map of Filchner (1914), but as this name has already been used by G. Nordenskiöld in 1892 for another locality, the mountain (Mount Temple of Mr. Mathieson) had to be given a new name and was called Sindballefjellet after the Svalbard Commissioner Prof. Dr. Kristian Sindballe.

It is quite clear that the old whalers who first applied the term "Hoek" thereby meant more than a low cape; they also meant the mountain itself, visible from a long distance.

On map No. 14 I have tried to fill in more details from Mr. Mathieson's map of Gips Valley, but had to give it up as not practicable. If the reviewer will compare the map with ours he will surely realize that two maps of so different standard cannot be combined with advantage. The names on the map of Mr. Mathieson have all been incorporated in our list of place-names and will be retained where they have priority, granted that the name has not been applied before to another locality.

We are now working to clear up the chaos of place-names of Svalbard. It is a big task, involving as it does the examination of nearly every book and map about the country published since its discovery. It is an ungrateful task which is bound to cause some criticism, anyhow. All I can ask for is that any one doing so goes into the question closely before criticising.

ADOLF HOEL.

Norges Svalbard-og Ishavs-undersøkelser,
Oslo, 26 February 1929.

Dr. Hoel has corrected me in the use of a phrase which I admit was liable to misinterpretation. I should have said that the atlas does not claim to embody new surveys made for the publication, for I am well aware that some of the surveys have not previously been published. Those that Dr. Hoel quotes were made many years ago. I confess that I fail to understand why the map of Gips Valley, which from its inclusion in the atlas I presume to be accurate, could not embody the details of Mr. Mathieson's survey published in 1920.

The translation of place-names seems to me to be unfortunate. A proper name is a label, and even if capable of translation should, I think, be preserved in the original form. This opinion I need scarcely assure Dr. Hoel is given without any suggestion of depreciating the excellent Norwegian work in Spitsbergen. In a recent official Canadian map of the North-West Territories (1926) many Norwegian names given by Captain Isachsen in 1898–1902 have not been translated, although they apply to British territory, e.g. Stor island, Svarte fjord, Sydkap fjord, Björne peninsula, etc., etc. These are surely parallel cases. Some of the changes I cited in my review are bound to cause confusion in

various scientific memoirs in which the better-known forms are used. Some years ago Sir Martin Conway suggested reverting to the early names of Spitsbergen features, but he had to admit that some names were too well established by usage to be changed, even though other names had prior claims.

To argue that the early whalers *meant* a mountain as well as a cape by the term Gips Hoek is a dangerous precedent to allow. The name has for centuries been used for the cape, which is a distinctive feature. If it is to be transferred, where is this kind of transference to end?

As one who has worked much in Spitsbergen, I can appreciate Dr. Hoel's difficulties in unravelling the confusion of Spitsbergen nomenclature. I look forward with much interest to the conclusion of his work, and I can assure him that I do not lightly offer criticism in this difficult task. R. N. R. B.

MEETINGS: SESSION 1928–1929

Eleventh Evening Meeting, 15 April 1929. The President in the Chair

Elections: Neal Marshall Carter; Philip M. Chancellor; John B. Charlesworth; Denis Cooil; Commr. Edward Elliott Neville Dawson; Lt.-Col. Frederick Eustace Dunn; John Onslow Fane; Alfred Mollyneux Hawes; Silvio St. Romaine Korper; Commr. James Victor Vincent Magrane, R.N.; Mrs. Anne G. Medley; Hugh Paul, M.D., B.CH., D.P.H.; Howard Ernest Raynold-Gill, A.C.P.; Leslie Frank Rice, B.A.; Harwood Steele; Miss Marjorie Strachey; William Lester Tolmie; H. G. Quaritch Wales, M.A.; Arthur Ernest Wilson, M.SC., L.C.P.; Lieut. Derek Wyburd, R.N.

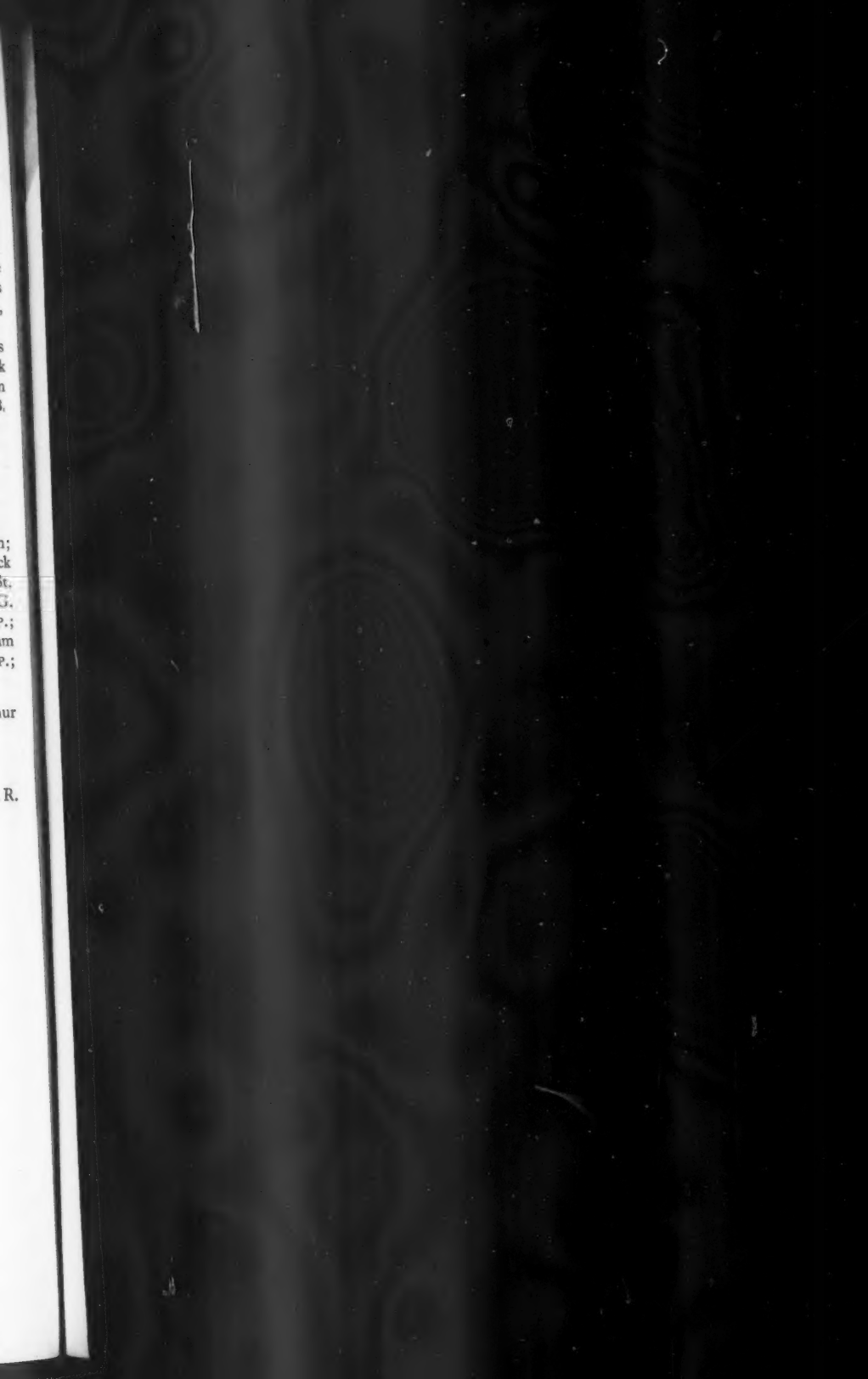
Paper: Some Problems of Arctic travel: after a crash. By Dr. Vilhjalmur Stefansson

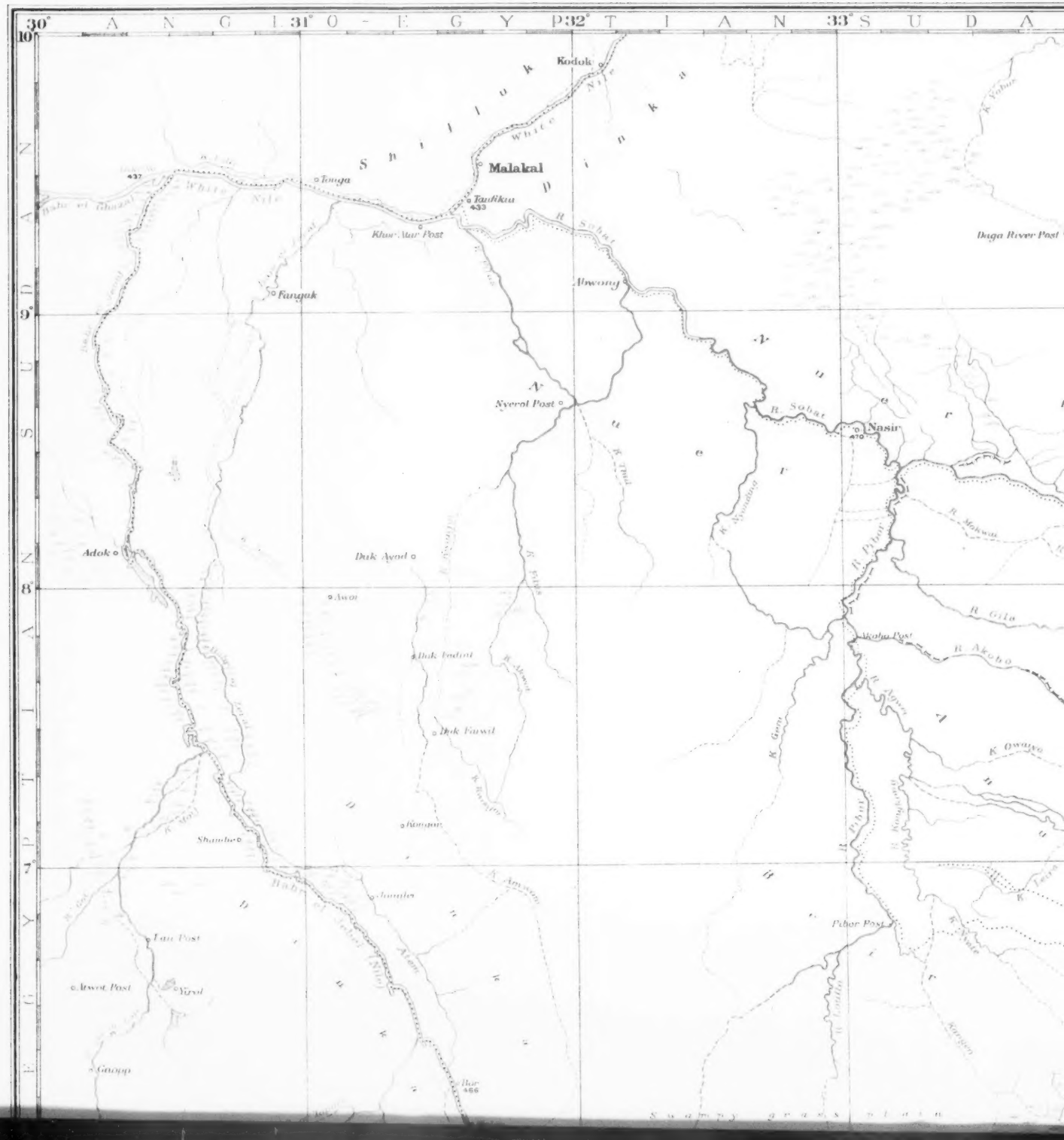
Sixth Afternoon Meeting, 22 April 1929. The President in the Chair

Paper: Roger Barlow: an early XVIth-century geographer. By Miss E. G. R. Taylor

Special Evening Meeting, 22 April. The President in the Chair

Paper: The Search for Colonel Fawcett. By Mr. George M. Dyott

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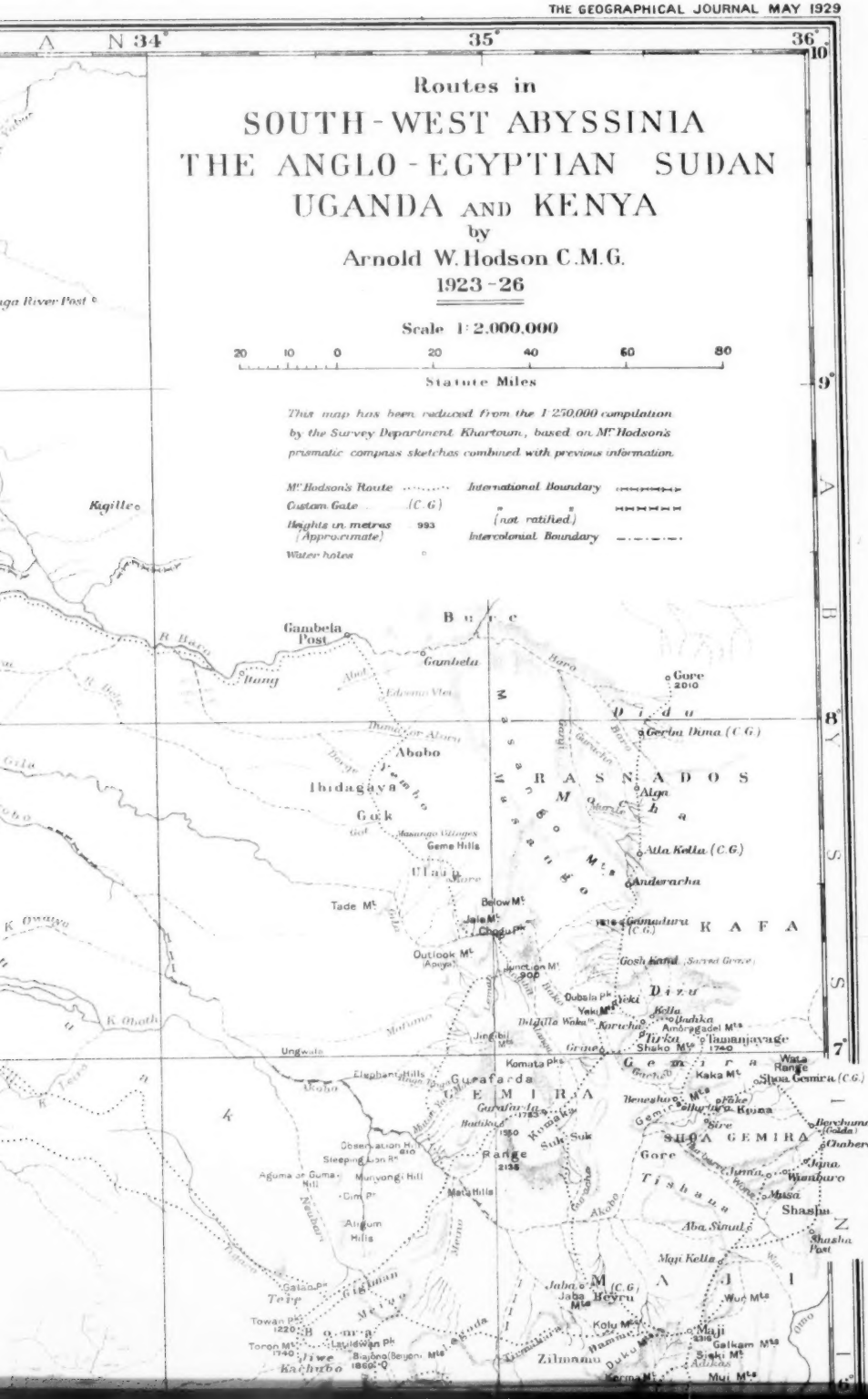
Routes in
SOUTH-WEST ABYSSINIA
THE ANGLO-EGYPTIAN SUDAN
UGANDA AND KENYA
by
Arnold W. Hodson C.M.G.
1923-26
Scale 1:2,000,000
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This map has been reduced from the 1:250,000 compilation by the Survey Department, Khartoum, based on Mr. Hodson's prismatic compass sketches combined with previous information.
Mr. Hodson's Route
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Kella
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Tirkel
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Jangibi
Ungwale
Komata Phs.
Elephant Hills
Gurafarda
Gurafarda 1782
Badikaa 1550
Kunda Kk.
Suk Suk
Range 2136
Observation Hill 2110
Sleeping Lion Rk.
Aguma or Guma Hill
Muriyongi Hill
Dim Ph.
Mata Hills
Abugum Hills
Kaka Mt.
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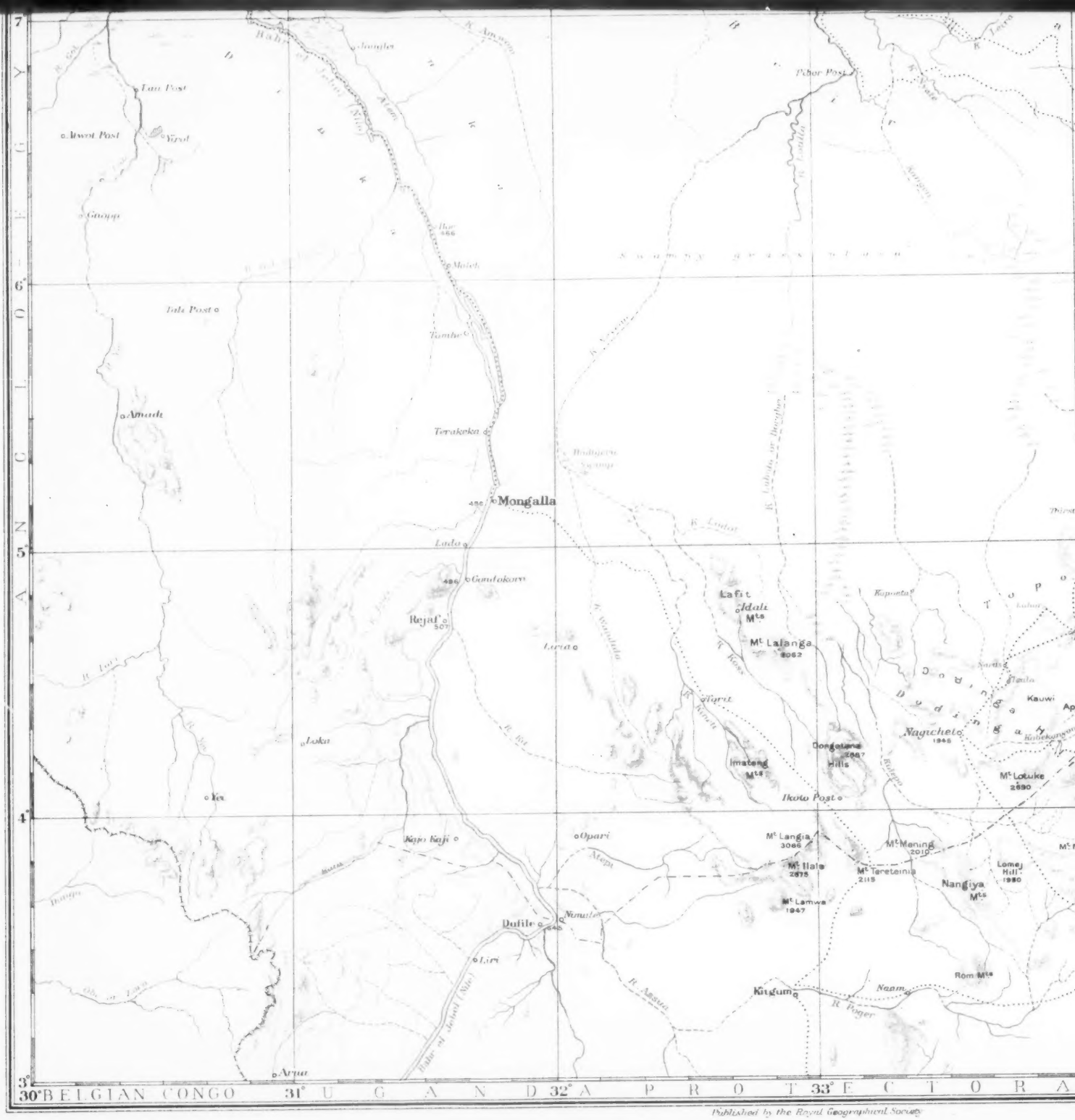

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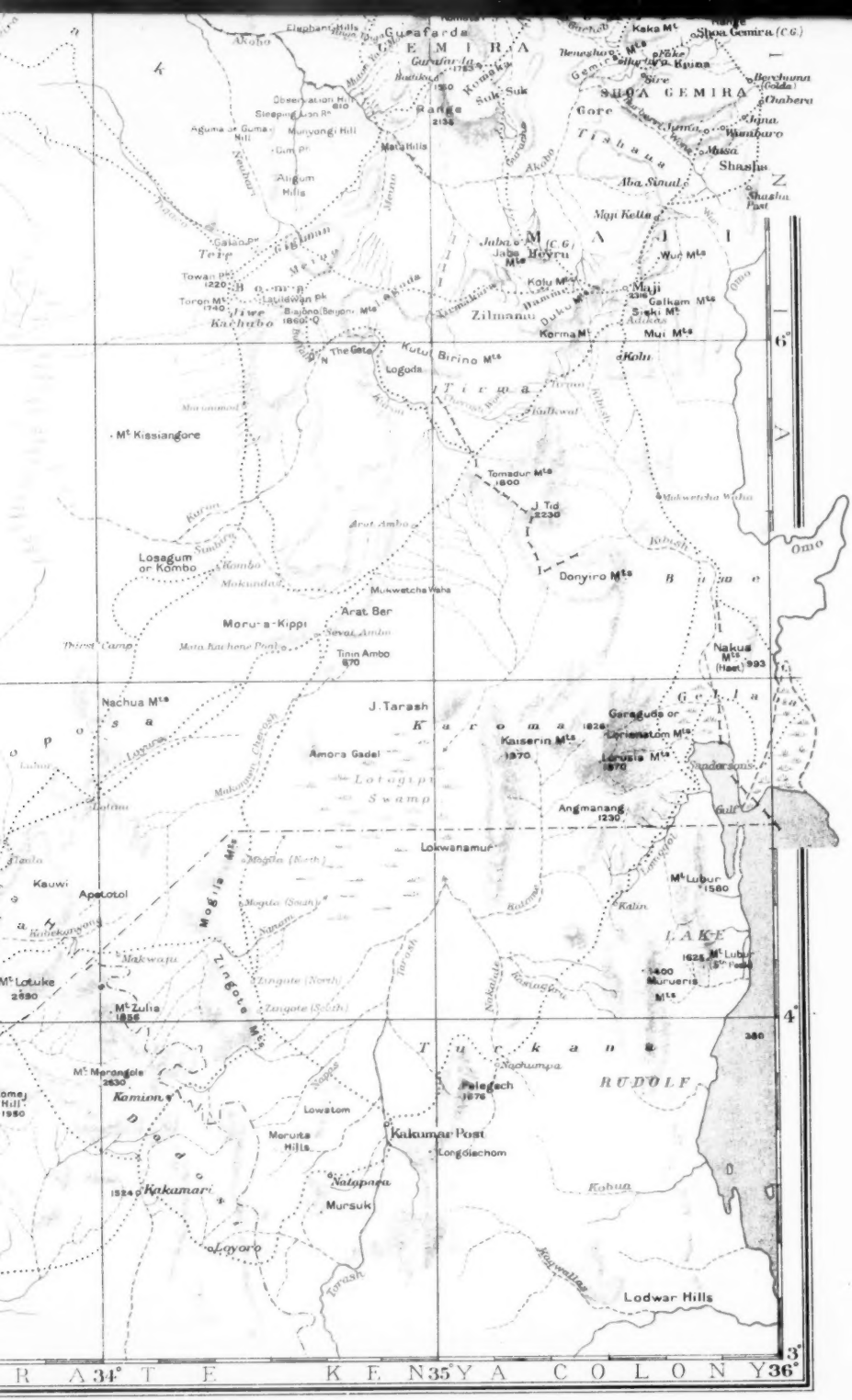

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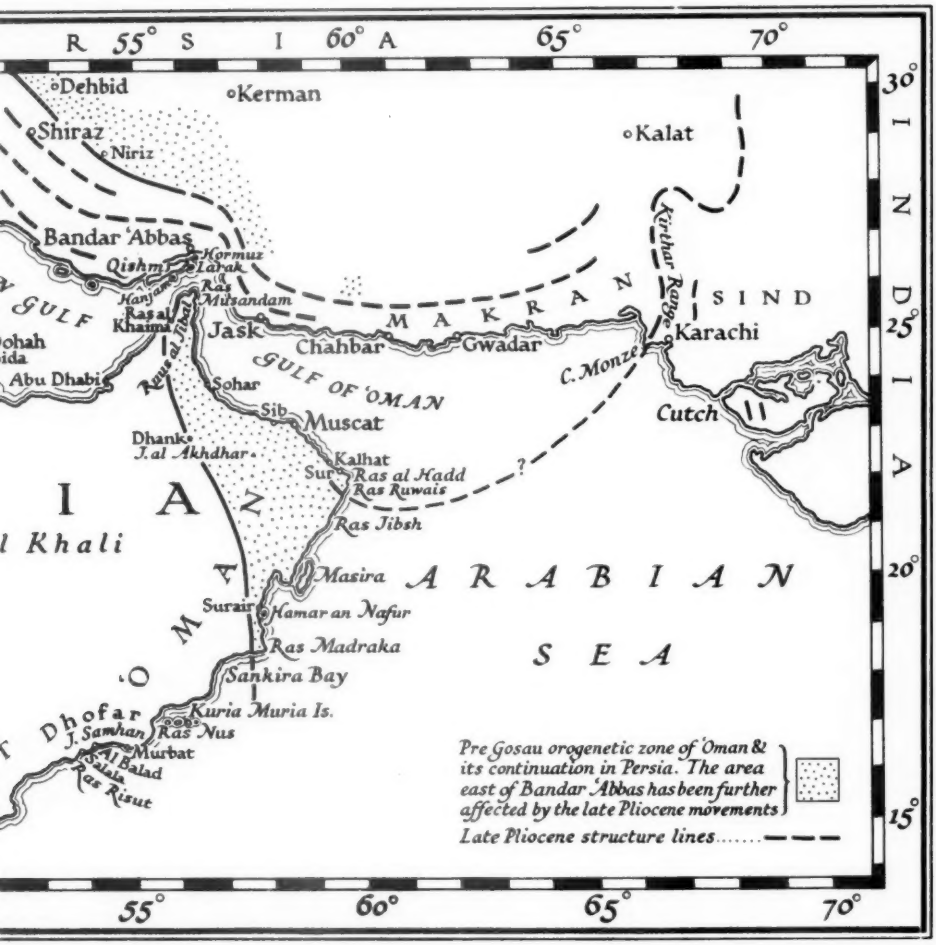

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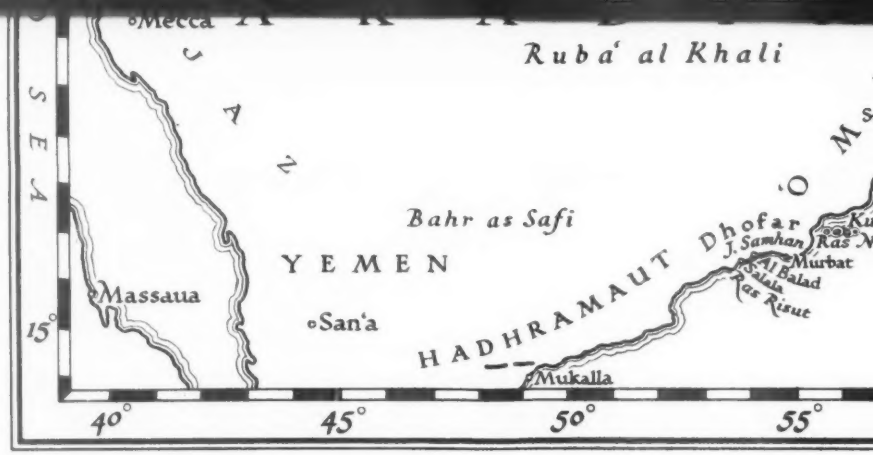

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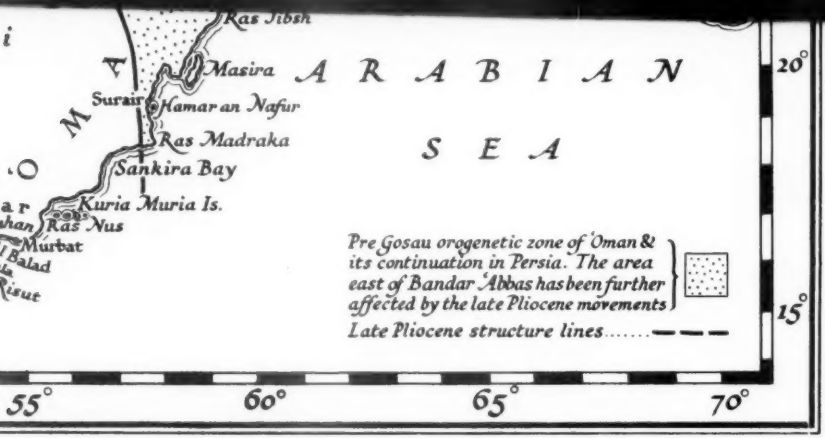

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LETTERING ON R.G.S. MAPS

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